Canon SERVICE BULLETIN **COMP. SYSTEMS**
Issued by Canon Europa N.V.

MODEL: BJC-55

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(QK-12E-0129)
Date: 29.09.00

LOCATION: MAIN UNIT

SUBJECT: DIFFERENCES BETWEEN BJC-50 AND BJC-55

DETAIL

This bulletin has been issued to notify of the differences between the BJC-50/50v and BJC-55/BJ M40 for servicing. This has been issued as a substitute for the Service Manual, which will not be issued. C.IWS applies to the BJC-55/BJ M40.

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1. PRODUCT OUTLINE

The BJC-55/BJ M40 are mobile, color BJ printers targeting the personal-use market. As a successive model of the BJC-50/50v, the ease of connection has been improved, mobile printer function has been strengthened, and the following functions have been added:

(1) The high-speed IrDA (Ver.1.1) enables the printer to attain print speed comparable to that of the Centronics interface.
(2) Direct printing from digital cameras with IrTran-P. (BJ M40 only)
(3) Support of the USB I/F function.
(4) Photo printing function.

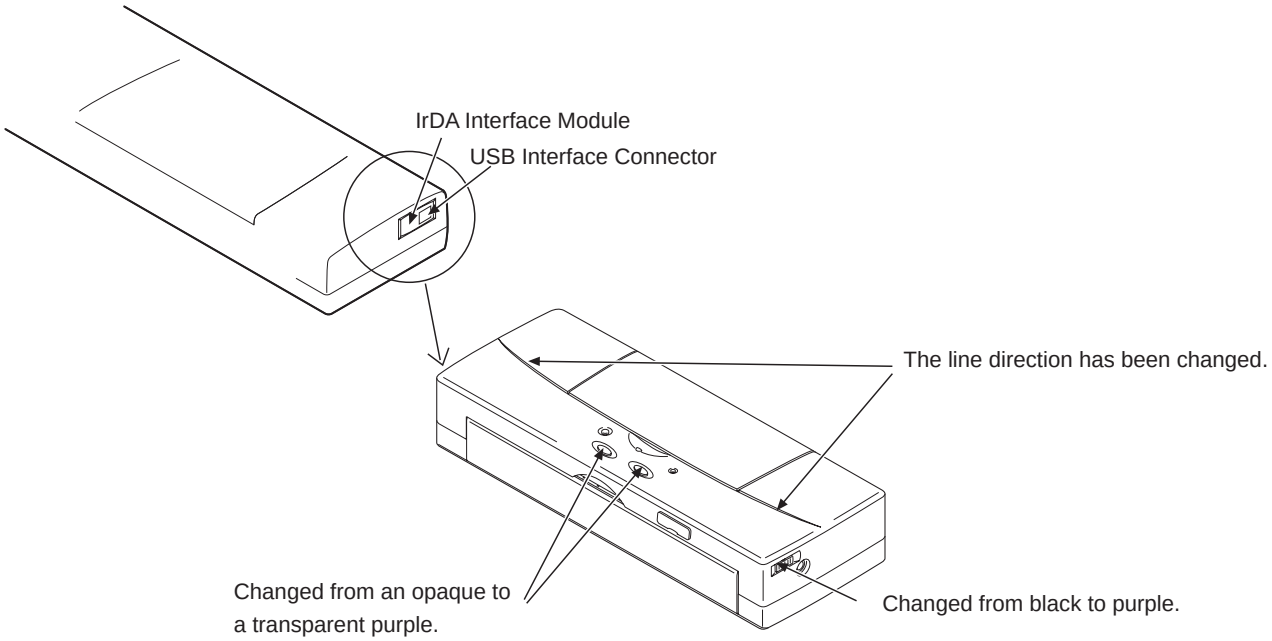
2. CHANGES FROM THE BJC-50/50v

1) New adoption of the photo cartridge (Photo printing function has been added.)
2) The IrDA version upgrade from Ver. 1.0 to 1.1 has enabled faster transmission.
3) New adoption of IrTranP (Direct printing from digital cameras/BJ M40 only).
4) Parallel interface has been eliminated. USB I/F has been adopted.
5) Button reset of the ink low warning is added.
6) Demonstration pattern printing is eliminated.
   (The other self test print can be performed by the same operation as with the BJC-50/50v.)
7) Various specifications
8) A special tool (spur cleaner) is included.

3. EXTERNAL APPEARANCE

The BJC-55/BJ M40 has the same appearance as the BJC-50/50v, except for the following:

(1) The USB I/F connector has been positioned on the left side of the printer. Along with this, the IrDA module has been moved, and the parallel interface has been eliminated.
(2) The color of the panel switch has been changed from an opaque to a transparent purple.
(3) The color of the lock switch has been changed from black to the same purple as the panel switch.
(4) The line direction along the head cover of the upper cover has been changed.


IrDA Interface Module
USB Interface Connector
The line direction has been changed.
Changed from an opaque to a transparent purple.
Changed from black to purple.

4. SPECIFICATIONS

4-1. Printer Specifications

Type	Mobile serial color bubble jet printer
Paper feeding method	Manual sheet feed / Auto sheet feed (when the optional ASF-50 has been installed.)
Printing speed	Throughput:

	High Speed	Standard	High Quality
BC-10 Bk Cartridge			
New monochrome pattern (E)	5.5 ppm	5.0 ppm	-----
New monochrome pattern (J)	5 ppm	5.0 ppm	-----
BC-11e Color Cartridge			
New color pattern (E)	2 ppm	1.6 ppm	-----
New color pattern (J)	2.0 ppm	1.8 ppm	-----
BC-12e Photo Cartridge Full address printing	-----	-----	0.1 ppm

Printing direction	Unidirectional (automatically selected according to the print data)	
Max. Print Width	203 mm (8 inches)	
Line feed pitch	136 ms/line (128" /360" line feed)	
Built-in print control mode	LQ mode (BJC-55 only) / BJ mode (BJ M40 only) / Native mode / BJL command	
Detection functions	Presence of paper: Available Presence of BJ cartridge: Available Waste ink amount: Available Paper width: Not available Distinction of BJ cartridge: Available Ink low: Available (by using the dot-count)	
Noise	Sound pressure level: conforms to ISO9296 Approx. 43 dB (A) or less during operation (HQ/HS mode)	
Environmental requirements	During operation	Temperature 5°C to 35°C (41°F to 95°F) Humidity 10%RH to 90%RH (no condensation)
	Non operation	Temperature 0°C to 35°C (32°F to 95°F) Humidity 5%RH to 95%RH (no condensation)

Power supply

Input voltage/Frequency: AC100 -240V, 50/60 Hz

Power consumption

Printing status	Standby status	Soft power off	Charging status
Approx. 23 W*	Approx. 1.7 W**	Approx. 0.9 W**	Approx. 10 W**
	Approx. 1.8 W***	Approx. 1.0 W***	Approx. 10 W***
	Approx. 2.6 W****	Approx. 1.6 W****	Approx. 10 W****

*: Approx. 30 W when the AC adapter is used.
**: When the input power is AC 100V.
***: When the input power is AC 120V.
****: When the input power is AC 230 - 240V.

External dimensions	302 mm (W) x 112.5 mm (D) x 50 mm (H)
Weight	Approx. 0.9 Kg (including BJ cartridge)

4-2. Number of Pages Printable of the Cartridges

Black BJ Cartridge BC-10:	Approx. 270 pages (JAIDA J1 Pattern: Japanese measurement pattern for pages printable) (1500 character pattern: Overseas measurement pattern for pages printable)
Color BJ Cartridge BC-11e:	Bk: Approx. 160 pages (ISO JIS-SCID N5 Pattern) Cl: Approx. 50 pages (ISO JIS-SCID N5 Pattern)
Color BJ Cartridge BC-12e Photo:	Bk: Approx. 60 pages (ISO JIS-SCID N5 Pattern, High resolution paper) Cl: Approx. 20 pages (ISO JIS-SCID N5 Pattern, High resolution paper) Bk: Approx. 90 pages (ISO JIS-SCID N5 Pattern, Plain paper) Cl: Approx. 35 pages (ISO JIS-SCID N5 Pattern, Plain paper)

Note: See *"4-5 Photo BJ Cartridge Specifications"* for details of the BC-12e.

4-3. Printer Driver / Scanner Driver Type

Valid driver and interface part combinations for this printer are shown below.

	Printer Driver		Scanner Driver	
	USB I/F	Infrared I/F	USB I/F	Infrared I/F
Windows 95/98	Δ*1	Δ*2	O	Δ*4
Windows 2000	O	Δ*3	O	Δ*4
Windows CE	O	O	X	X
Macintosh	O	X	O	X

O: Compliant Δ: Conditionally compliant X: Not compliant

*1 The operation of the printer driver supporting USB is assured only in preinstalled Windows 98 PCs.

*2 IrDA 1.1 is assured only in preinstalled Windows 98/2000 PCs, except PC-9800 series.

*3 Except PC-9800 series. Restricted as shown in 4-3-1.

*4 Except PC-9800 series.

4-3-1. Restrictions on IrDA communication under Windows 2000

The following restrictions or problems occur in case of communication via IrDA under Windows 2000, connecting with this printer.

<Restrictions>
As only one-way communication is possible, status information of the main unit cannot be obtained, causing the following restrictions:

1) The status monitor does not function.

Therefore, the status monitor is disabled by default in the printer driver of this printer in the case of communication via IrDA under Windows 2000. Users can start the status monitor by selecting "Start Status Monitor" from the "Property" sheet, however, "Communication Impossible" is indicated.

2) The installed cartridge is unknown.

3) The possibility of ink-low error is displayed only by printer LED. (The information is not displayed on the host computer.)

4) The print job cannot be canceled from the host computer when an error has occurred.

   After the cause of the error is resolved, the printer can be recovered by pressing the *RESUME* button on the printer's operation panel. The error can then be recovered on the host computer, although the ongoing print job is deleted.

Plug and Play is not supported.

<Possibly occurring problems>
1) The host computer occasionally fails to recognize the infrared port of the printer in 4Mbps communication. "Hard power reset," i.e. disconnection of the printer from mains power and removal of the battery, is required to recover from this condition. The frequency of occurrence and the duplication are low. In case of frequent occurrence, however, this problem can be avoided by lowering the communication speed.

2) If the cleaning operations, etc., start during printing, the error message "Write error" may be displayed on the host computer. When the cleaning operations, etc. are finished, the error message disappears, and printing operations continue.

3) If another operation is executed at the host computer (eg., launching another application) while printing a large file (printing photo images from Photoshop etc.), paper may automatically be ejected, or the printer may reset.

4-4. Interface Specifications

The interface specifications of this printer are shown below.
1) Infrared Interface
   IrDA Interface Ver. 1.1 / IrTranP
   ASK Interface
2) USB Interface

<Differences from the BJC-50/BJC-50v>
1) The supported version of IrDA has been changed from Ver. 1.0 to 1.1.
2) IrTranP compliant. (BJ M40 only)
3) USB interface compliant.
4) Parallel interface has been eliminated.

4-4-1. IrDA Interface
1) Interface
   IrDA Version 1.1 compatible

2) Optical specifications
   Light generation

Wavelength:	0.85 to 0.90 µm
Intensity:	100 to 500 m W/Sr
Light angle:	Approx. ±15° (along optical axis)

Light interception
Wavelength: 0.85 to 0.90 µm
Intensity: 4µ W/cm^2 to 500m W/cm^2
10µ W/cm^2 to 500m W/cm^2
(when the communication speed is more than 0.576 MHz.)
Light angle: Approx. ±15° (along optical axis)

3) Transfer speed: 9600/19200/38400/57600/115.2k/576k/1.152M/4M bps

4) Communication method: Half duplex, start/stop system (bidirectional):
when the transfer speed is less than 115.2kbps
Half duplex, frame synchronization system (bidirectional):
when the transfer speed is more than 0.576Mbps

5) Communication distance: 0 to 1m: when the transfer speed is less than 115.2kbps
0 to 0.8m: when the transfer speed is more than 0.576Mbps

6) Maximum data reception: 2048 byte/packet

7) Modulation method: 3/16 RZI (Return to Zero Invert):
when the transfer speed is less than 115.2kbps
1/4 RZI (Return to Zero Invert):
when the transfer speed is 0.576Mbps and 1.152Mbps
4 PPM (Pulse Position Modulation):
when the transfer speed is 4Mbps

4-4-2. USB Interface

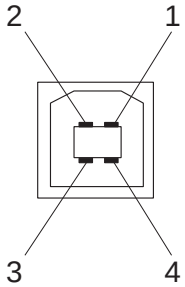
<Specifications>

1) Device structure: Self-powered device

2) Data transfer method: Half duplex serial interface
Universal Serial Bus Specification Revision 1.0 compatible
Universal Serial Bus Device Class Definition for Printing Device Version 1.0 compatible
Signal rate: 12Mbps (full speed)
Transfer type: Control transfer/Bulk transfer

3) Input/output circuit

No.	Signal name	
1	Vcc	
2	-Data	Data signal line
3	+Data	Data signal line
4	GND	



Series B

<Signal level>
Vcc: "H" level input voltage: +2.0V to +5.5V
"L" level input voltage: +0.0V to +0.8V
-Data, +Data: Differential input sensitivity: Min. 0.2V
"H" level input voltage: +2.8V to +3.6V
"L" level input voltage: +0.0V to +0.3V

4) Interface cable: Material: AWG No.28 or larger
Full speed device cable (twisted pair shielded cable)
Less than 5 m

5) Interface connector: Printer-side: USB (Series B) receptacle
Cable-side: USB (Series B) plug

4-5. Photo BJ Cartridge Specifications

Photo cartridge BC-12e

BJ cartridge BC-12e: Replaceable color BJ cartridge (drop modulation adopted)
Ink cartridge BCI-12Bk: Black (64 nozzles)
Ink cartridge BCI-12Color: Yellow, Magenta, Cyan (24 nozzles x 3)

Weight: Approx. 29 g (including both ink cartridges)
Print speed: Approx. 0.1 ppm (A4 full address printing: reference value)

Nozzle check pattern: Same as the BC-11e

HR-Fine mode

Carriage motion: 3 pass
Printing nozzle: 8 nozzles
Resolution: 360 dpi
Carriage driving frequency: 5.00 kHz

Photo print mode can be used to obtain high level gradation print quality when using the Photo BJ cartridge. These cartridges contain low density ink which achieves a rich gradation and reduced graininess by printing several times over the same dot.
The printer driver divides the pixel data into a maximum of 4-values (not printed, print 1 dot, print 2 dots and print 3 dots) enabling each pixel to be printed in up to 4 gradations. The printer therefore makes three passes using a maximum of 150% more ink than usual. This Photo cartridge adopts drop modulation, decreasing granularity of the low density parts by efficiently ejecting large and small ink droplets.

Head ID

Head		Carriage ribbon cable contact part pin No. / Signal name		
		11/ID0	12/ID1	13/HCONT
	BC-10	L	L	H
	BC-11e	H	L	L
	BC-12e	H	H	L
	No head installation error	H	H	-----

The printer cannot detect ink cartridge type, and the ink cartridges suitable for the BC-11e and BC-12e heads are not incompatible, so that the following installation problem may occur. Regardless if the BCI-12 Bk/Color low density photo ink cartridge is installed in the BC-11e by mistake, the printer recognizes it as the usual BC-11e color cartridge, resulting in low density imaging. Likewise, if the BCI-11 Bk/Color cartridge is installed in the BC-12e head, the opposite occurs and high density image printing takes place.

5. OPERATION

5-1. Function Setting

Default setting

The default settings can be selected by button operation when the power is turned on. When the printer is turned on, hold down the *POWER* button until the beeper sounds the specified number of times for the desired function setting (BJ M40: Table1&2), and release the *POWER* button to set.

Function Setting

Mode	Beeper	Remark
Table 1	7 times	Factory default setting (Japan/CCSI /Canada/low voltage regions)
Table 2	8 times	
Table 3	9 times	Factory default setting (Others)
Table 4	10 times	
Table 5	11 times	
Table 6	12 times	BJC-55 only

BJC-55

<Points of difference from the BJC-50>

1) No BJ mode setting
2) Addition of setting to enable/disable the ink low warning.
3) Addition of euro font setting (Code Page 858).

	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
Print mode	HQ	HQ	HQ	HQ	HQ	---
Left Margin	LTR	LTR	A4	A4	A4	---
Text Scale Mode	Disable	Disable	Disable	Disable	Disable	---
Paper Feed Position	8.5 mm	8.5 mm	8.5 mm	8.5 mm	8.5 mm	---
Smoothing	Disable	Disable	Disable	Disable	Disable	---
Reduction	1/1	1/1	1/1	1/1	1/1	---
Automatic Power Off	Enable	Enable	Enable	Enable	Enable	---
Font	Roman	Roman	Roman	Roman	Roman	---
Font Lock	Disable	Disable	Disable	Disable	Disable	---
Input/Download Buffer	25kB/0kB	25kB/0kB	25kB/0kB	25kB/0kB	25kB/0kB	---
Automatic Line Feed	CR	CR	CR	CR	CR	---
International Character Set	USA	USA	USA	USA	USA	---
Character Set	Italics	Italics	Italics	Italics	Graphics	Graphics
Code Page	437	437	437	437	858	858
Ink Low Warning	Disable	Enable	Disable	Enable	Disable	---

Note:
The setting to enable Table 6 changes only "Character Set" and "Code Page." (That is, "Character Set" and "Code Page" are changed to "Graphics" and "858," respectively.)

BJ M40

<Difference from the BJC-50v>

1) No setting regarding the LQ mode

2) The setting to enable/disable the ink low warning is added.

	Table 1	Table 2
Operation mode change	BJ	BJ
Print mode	HQ	HQ
Automatic power off	Enable	Enable
Smoothing	Disable	Disable
Remaining ink	Disable	Enable
Reduction	1/1	1/1
Paper feed position	8.5 mm	8.5 mm
Receive buffer	23 kB	23 kB
ANK character quality	Normal	Normal
ANK character set	Katakana	Katakana
CR function (+LF)	CR	CR
ANK international character	Japan	Japan

5-2. Ink Low Warning Reset By Button Operation

Ink low warning

This printer detects the remaining ink level by counting the number of ejected ink dots in the same way as the BJC-50/50v. When the setting of the ink low warning is enabled, and the remaining ink gets low, the beeper sounds twice, and the *ERROR INDICATOR* blinks. Pressing the *Cartridge Replacement* button will sound the beeper and move the carriage to the center, and the *ERROR INDICATOR* indicates the ink cartridge for which the remaining ink is low as shown below.
The ink low warning reset function by button operation is added to this printer. The button

Blinks once: when the remaining ink of the BCI-10 / BCI-11Bk / BCI-12Bk is little

Blinks twice: when the remaining ink of the BCI-11Color / BCI-12Color is little

Blinks 3 times: when the remaining ink of the BCI-11 BK & Color / BCI-12 BK & Color is little

operation procedures are shown below. (The ink low warning of the BJC-50/50v can be reset from the host computer only.)

Operation

1) Turn on the printer.

2) Press the *Cartridge Replacement* button to move the carriage to the center.
   If the carriage was moved to the center by the driver, the reset operation by the button operation is not possible.

3) Make sure that the proper cartridge is installed in the carriage. If not, install the proper one. (The ink dot counter reset is effective only to the ink cartridge type installed in the carriage.)

4) Press and hold the *RESUME* button for the number of beeps corresponding to the warned ink type to select the ink type for which the dot counter is to be reset, and release the *RESUME* button. The number of beeps is as follows:

Once:	The dot counter of the BCI-10/BCI-11Bk/BCI-12Bk is reset.
Twice:	The dot counter of the BCI-11Color/BCI-12 Color is reset.
3 times:	The dot counter of the BCI-11Bk&Color/BCI-12Bk&Color is reset.
4 times:	The selected ink type is canceled.

5) Press the *Cartridge Replacement* button.
   The dot counter of the ink selected in the procedure 4) and the ink low warning are reset, and at the same time, the carriage returns to the home position.

5-3. DIRECT PRINTING FUNCTION OF THE IMAGE FROM DIGITAL CAMERAS (BJ M40 only)

<Difference from the BJC-50/50v>
The new adoption of IrTranP has enabled the printing of data sent directly from digital cameras compliant to IrTranP standards, not through the host computer, but via IrDA communication.

Specifications

Data communication form:	IrTranP standards compatible
Input image size:	640 x 460 pixels
Input image capacity:	128 Kbyte or less
Output image size:	Landscape: 90 x 68 mm
	Portrait: 77 x 103 mm
	Seal printing: 19 x 26 mm x 16 images
Paper size:	Postcard

Operation

<Image printing>
If the printer is powered on and receives print data from digital camera, the printing operation will start.

<Reprinting>
The image data is also maintained in memory after printing, and will not be abandoned until new image data is received from the digital camera, or print data is input from the host computer. Reprinting of data is possible by pressing the *RESUME* button (and releasing before the beeper sounds).

<Printing cancellation>
During the printing of image data, printing is cancelled by pressing the *RESUME* button until the beeper sounds once, then releasing. In this case paper is delivered. The remaining data halfway through printing is abandoned. (As the image data has been maintained, it is possible to reprint the data, without resending the data from the digital camera.)

<Printing position definition>
To select the printing position, press the *POWER* button and *Cartridge Replacement* button simultaneously when the power is on, and release the buttons after the beeper sounds the number of times applicable to the printing position to be selected. This setting returns to the default (Landscape) by powering off. The number of beeps is as follows:

Once:	Portrait
Twice:	16-image seal printing
3 times:	Photo glossy card landscape
4 times:	Photo glossy card portrait
5 times:	Setting completed.

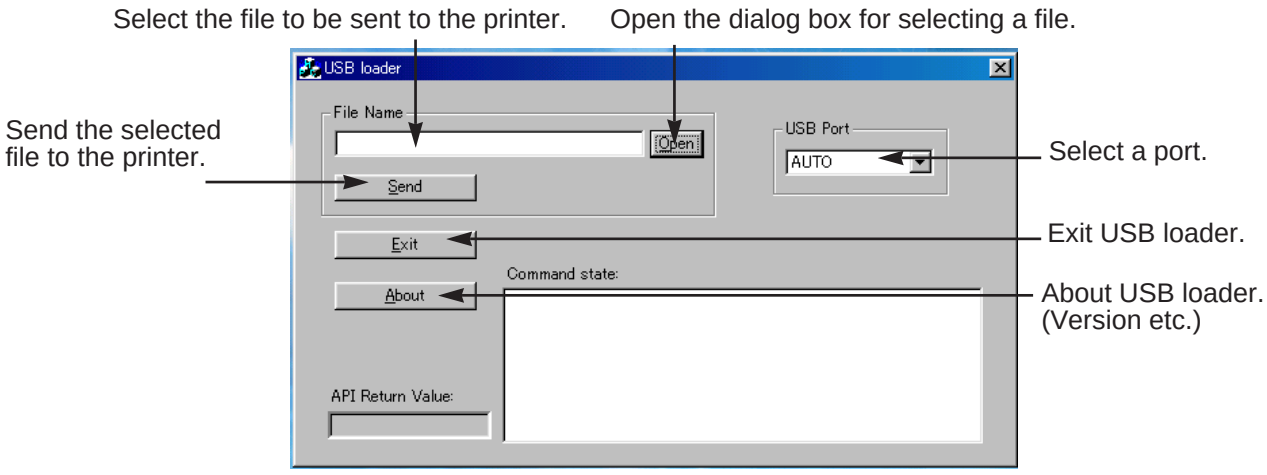
5-4. Flash ROM Writing Operation

<Difference from the BJC-50/BJC-50v>
As the BJC-55/BJ M40 does not have a parallel interface, the firmware of the Flash ROM is written using the "USB Loader."

5-4-1. Writing method

a) Download the USB Loader to the host computer.

(1) Send the USB Loader from the "Software download" page on QISS to the host computer.
This software will operate only on Windows 98 OS computers.
Also, the BJC-55 / BJ M40 printer driver must be installed.
(2) Connect the printer which the firmware is to be written with the host computer.
Note that the printer should be turned off.
The other USB devices should be unplugged from the host computer.
(3) Open the USB loader with a double-click.



<Main Dialog Box of the USB Loader>

b) Enter the writing mode of the printer.

(1) Remove the DC plug of the universal adapter and the Lithium Ion Battery.
(2) While pressing the *RESUME* button and *Cartridge Replacement* button, insert the DC plug of the universal adapter and release the buttons after one long beep.
(3) Press the *RESUME* button, and release the button after one short beep. When the initial sequence finishes, another short beep will sound, the Power LED lights, and the printer will enter the writing mode (stand-by-to-receive state.)

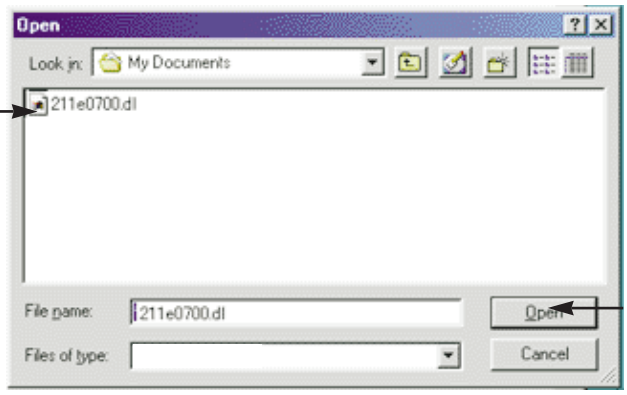
The *RESUME* button does not work while in the writing mode.
Do not turn off the power with the *POWER* button while in the writing mode.

c) Download the firmware.

(1) Download the firmware for upgrading from the software download page in QISS into the host computer.
(2) Select "AUTO" from the "USB Port" in the main dialog box of the "USB loader."

(3) Click "Open" to open the "Open" dialog box.
Select the file downloaded in the procedure (1).
Be sure to select the file from the "Open" dialog box. If the file name is input directly in the "File Name" of the main dialog box, the file name will not be selected properly.

Select the file to be sent to the printer.



Click here after selecting the file.

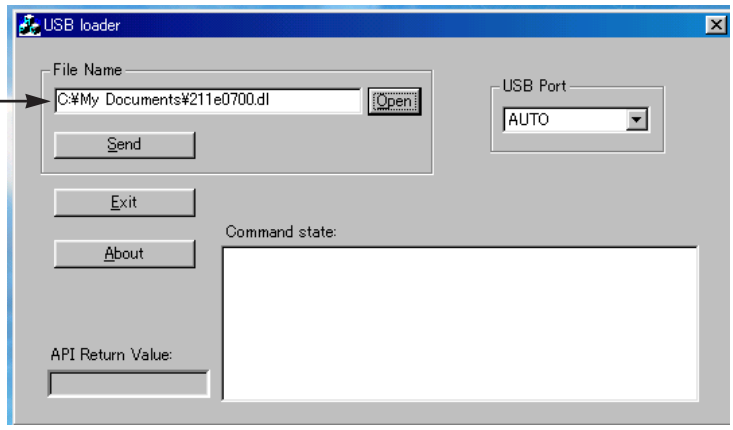
(4) Make sure that the selected file name and pass name are correctly indicated in the "File Name" of the main dialog box.

Make sure that the selected file name and pass name are correctly indicated.

Example:

C:´My documents´BJC55v 1000.DL

Pass Name File Name



(5) Click "Send" to download the selected file to the printer.
The writing process takes approx. 40 seconds, however, it may occasionally take longer, depending on the performance of the host computer and the transfer speed of the OS.

Please be careful not to turn off the power by unplugging the DC plug during file-writing operation.

(6) The Power Indicator of the printer blinks while the Flash ROM is being written to.
(7) When the short beeps sound twice on the printer side, and the Power LED lights, the writing operation has completed.
(8) After confirming the completion of the writing operation, unplug the DC plug from the printer. Unplugging the DC plug ends the writing mode.

(9) Confirm whether the writing has normally finished by outputting the list of the function setting status.

<How to output the list of the function setting status>
Attach the DC plug of the Universal Adapter, and install the battery in the printer. Then, press the *POWER* button at soft-power-off status, and release the button after two beeps. (For details, refer to "3.4. Self Test" in Chapter 3 "OPERATION" of the BJC-50/50v Service Manual.)

5-4-2. Writing error

If a writing error occurs, the following information is indicated on the printer:

Error Condition	Power LED	Error LED	Beeper
Data error	Lights	Blinks	Two long beeps
Flash error	Blinks	Reverse blink with the Power LED	Two long beeps
RAM error	Blinks	Synchronous blink with the Power LED	Two long beeps

If an error occurs, implement the following countermeasure:

Data error occurs:
As error checking is performed with each data set, when the error is been detected, the data has already been written. After also confirming the connection to the computer, re-enter the writing mode and transfer the correct data.

Flash error occurs:
As error checking is performed with each data set, when the error is been detected, the data has already been written. Re-enter the writing mode and transfer the correct data. If the same error occurs, the flash ROM may be damaged. Replace the Control Board.

RAM error:
Occurs when the RAM memory to be used for writing on the printer side is checked. The writing operation is not being performed. Replace the Control Board of the printer.

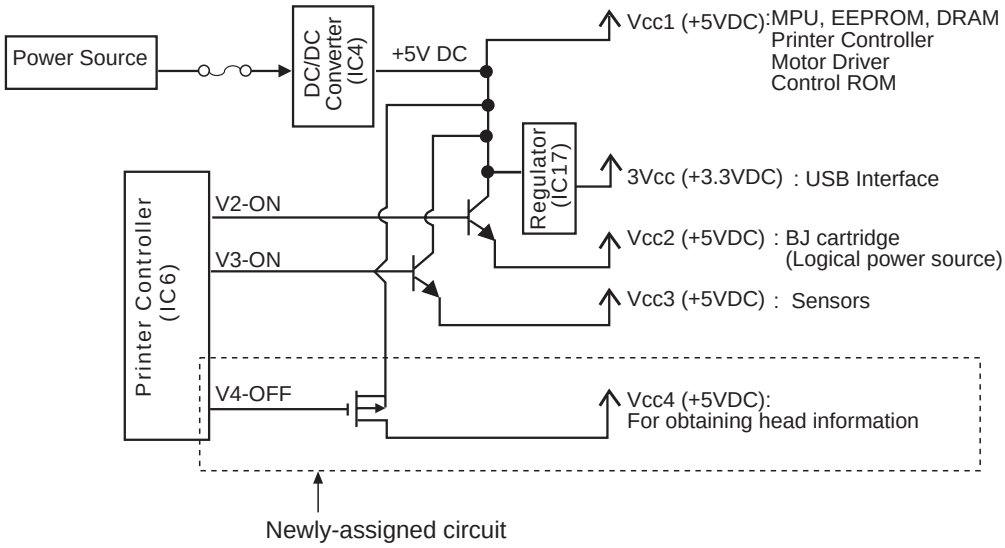
5-4-3. USB port selection

Each machine with a USB I/F has a unique ID, and the USB port of the host computer (USBPRNxx) is exclusively assigned to this. If a new USB device is connected, a USB port for the device is newly assigned. The USB port for the writing mode is assigned in the ROM writing mode of BJC-55/BJ M40. The ports which are enabled by the USB Loader are from 1 to 99. Note that only the USB ports assigned for writing mode from "USBPRN01" to "USBPRN99" are correctly written to.

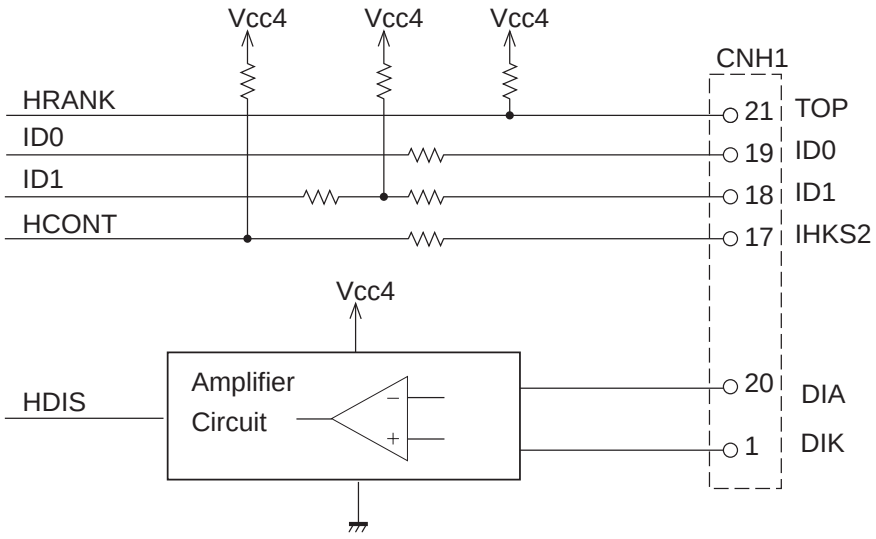
6. TECHNICAL REFERENCE

6-1. 5V Power Supply Circuit Change

The signal lines for obtaining head information (HRANK signal, ID0 signal, ID1 signal, HCONT signal, and HDIS signal) are common with the power resource "Vcc1" for the Logic Board IC of the BJC-50/50v. The Vcc4 power resource circuit has newly been added as a 5V power resource of the BJC-55/BJ M40 for the signal lines for obtaining head information.
The Vcc4 is the sequence which goes ON periodically, and only at soft-power-on. As a result, the load to the print head caused by applied voltage has been reduced.



<5V/3V Power Creation Circuit Block Diagram>



<Head Interface (Changed Part)>

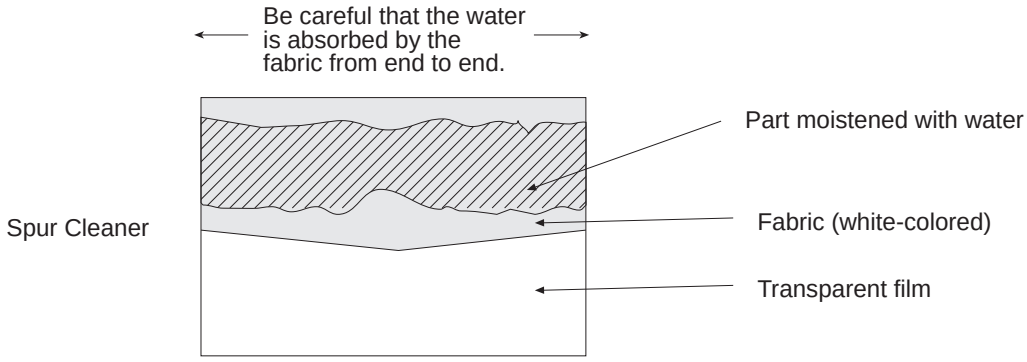
7. SPECIAL TOOLS

If spur marks are left on the print images, the spurs can be cleaned by using the spur cleaner. The spur cleaner is reusable until it loses its' effectiveness.

Special tool (part number)	**Remarks**
Spur cleaner (QY9-0055-000)	For cleaning spurs

Usage

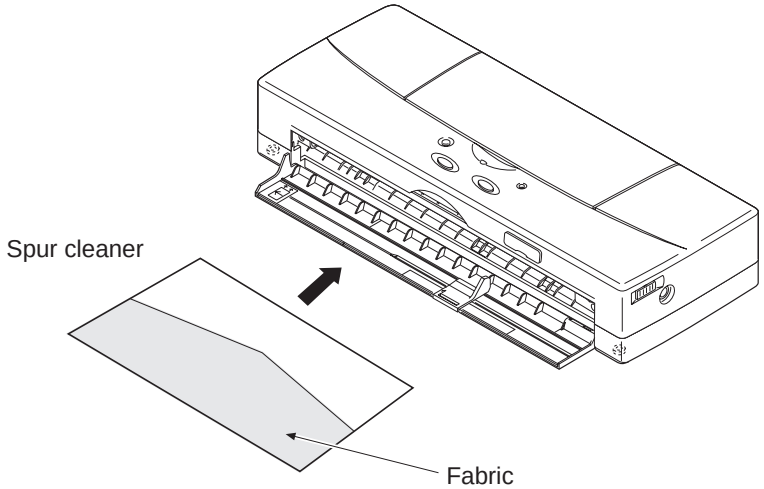
1) Moisten the fabric part of the spur cleaner with Approx. 5cc of water. Moisten the fabric with the water, as shown below, so that the fabric absorbs the water from end to end. Be especially careful that the area contacting the spurs absorbs enough water.


Be careful that the water is absorbed by the fabric from end to end.
Part moistened with water
Spur Cleaner
Fabric (white-colored)
Transparent film

In case too much water is used, there is the possibility that water will be wrung from the spur cleaner when passing through the paper feed roller, spread inside the printer, and cause failure.

2) Open the paper feeding tray.

3) Set the spur cleaner with the fabric-affixed part of the cleaner face-up and away. When the spur cleaner is set into the paper feeding opening, it is automatically fed into the main unit, and stops at the print start position.



4) Press the *RESUME* button, and release it after the beeper sounds once. The spur cleaner is delivered. For heavy soiling, repeat procedures 3) to 4) approx. 5 times.

5) Set a single sheet of paper to the ASF and repeat procedures 3) and 4). (To remove the moisture remaining in the paper feeding path.)

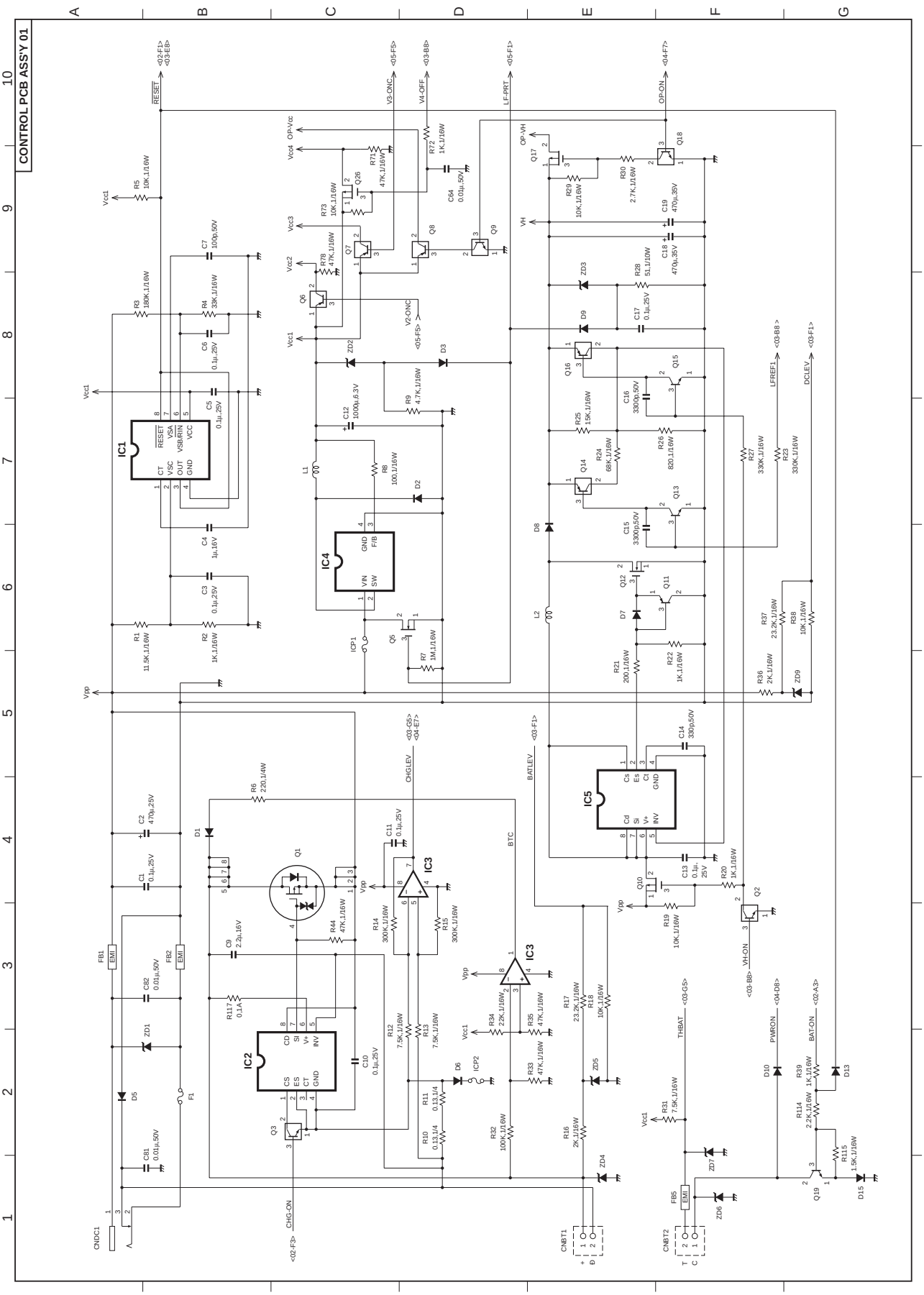
8. PARTS LIST

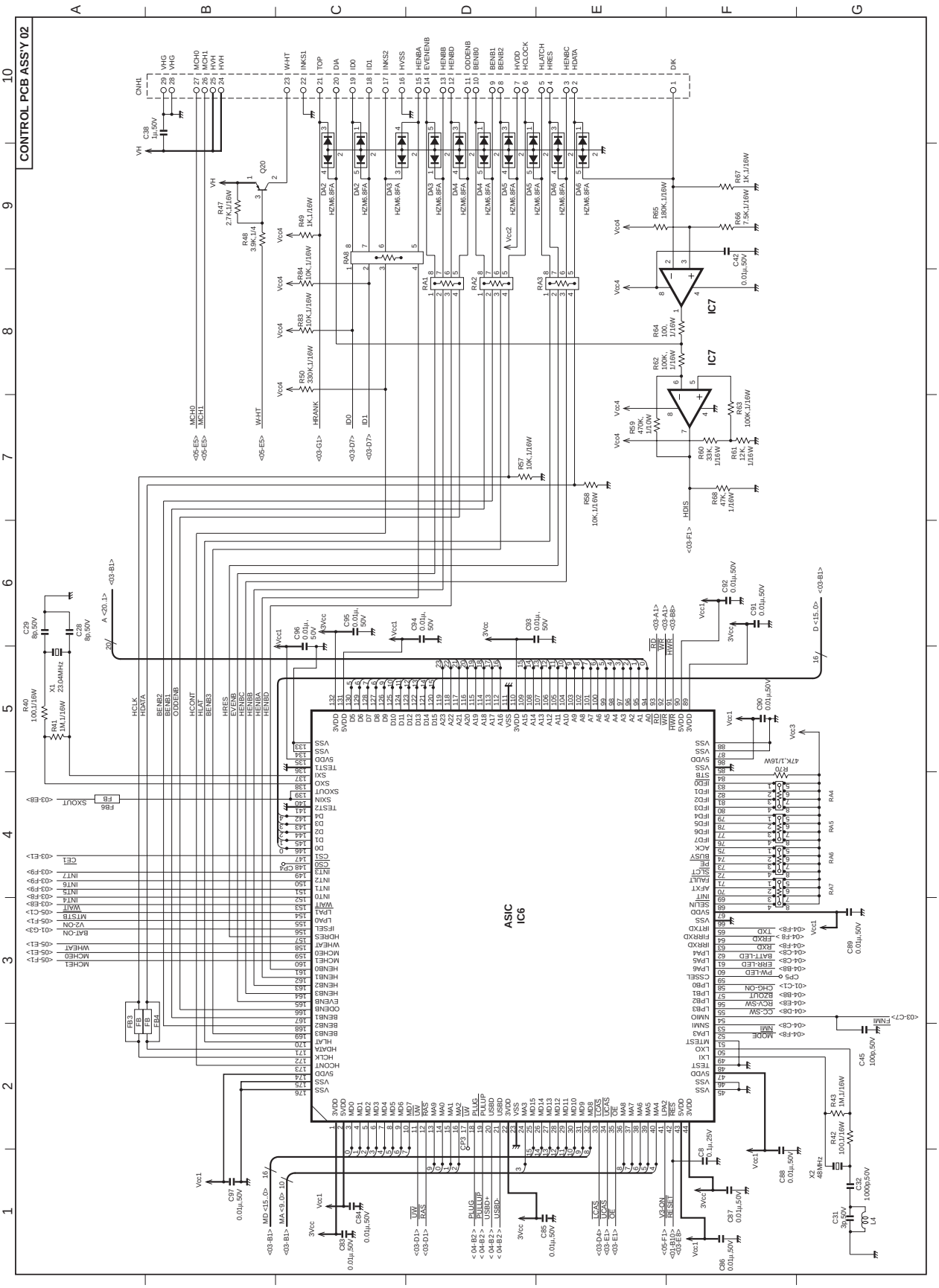
	BJC-55	BJ M40
Upper Case Unit	QG5-1536	QG5-1537
Head Cover	QB1-4700	QB1-4701
Instruction Film	QB1-4763	QB1-4762
Upper Case	QB1-4696	QB1-4697
Control PCB Ass'y	QG2-3208	QG2-3209
Flash ROM	QH8-0893	QH8-0894

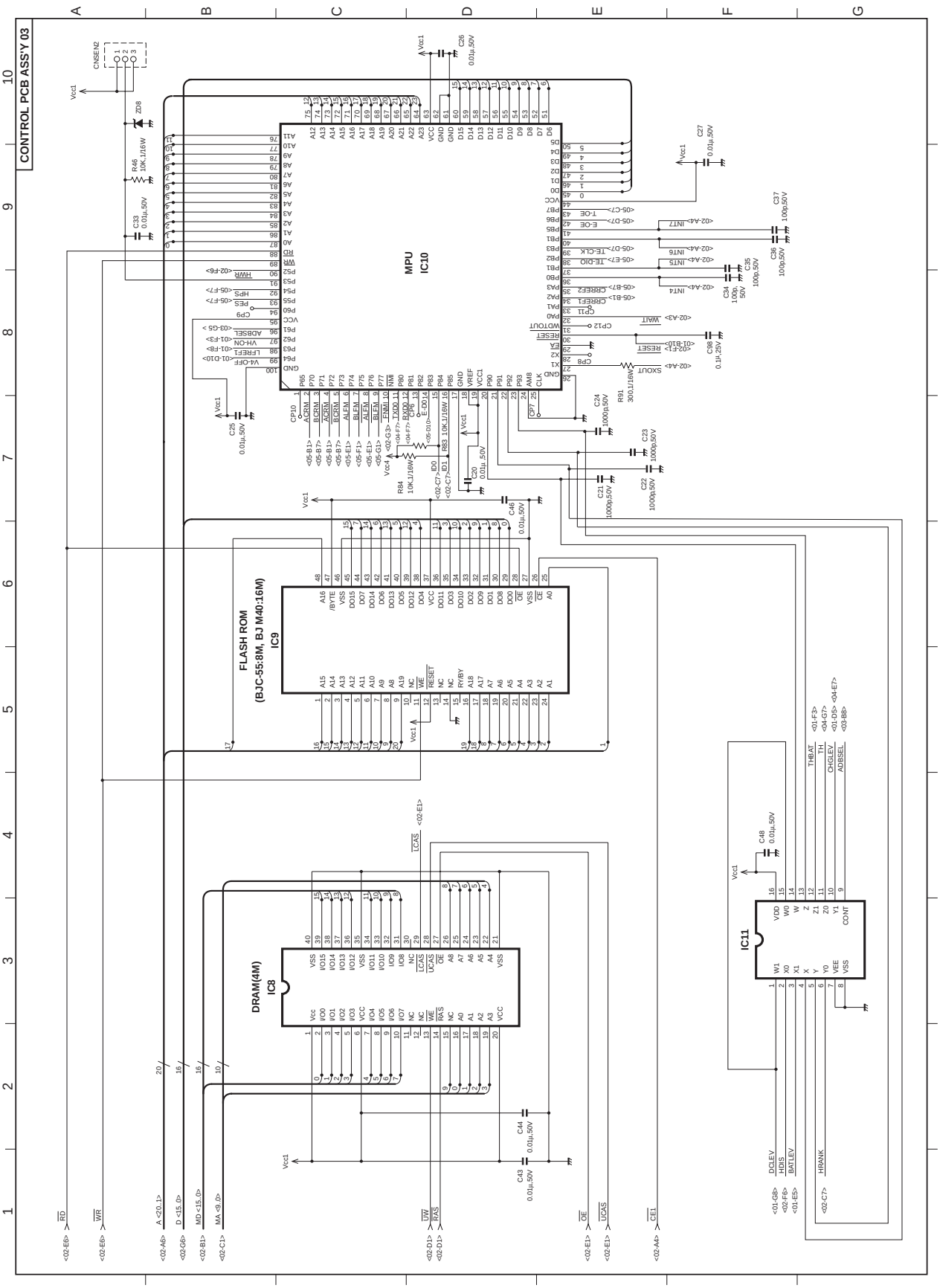
Other parts are common with the BJC-55/BJ M40.
For details, refer to the BJC-55/BJ M40 Parts Catalog (QY8-31AT-010).

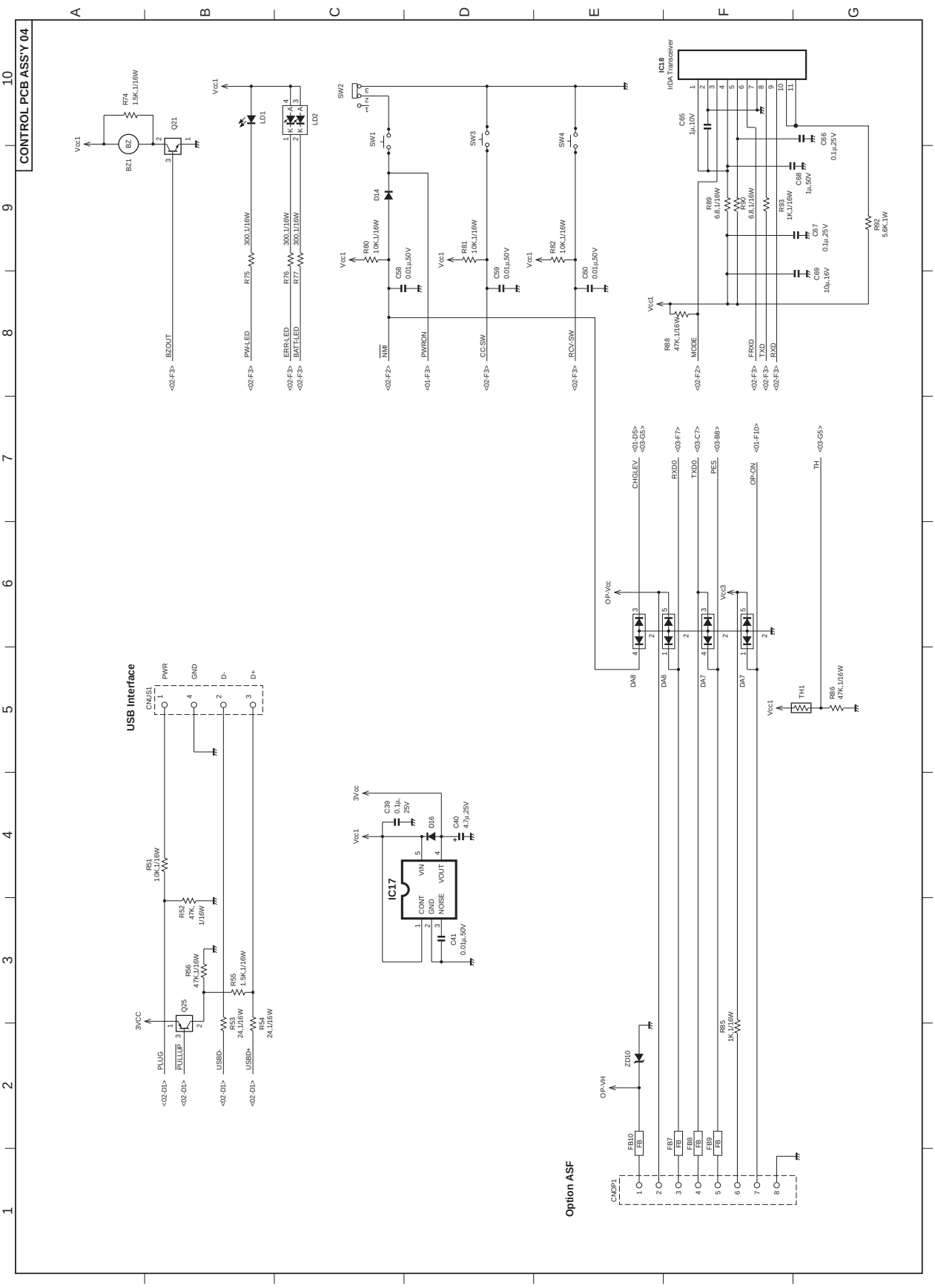
9. CIRCUIT DIAGRAM

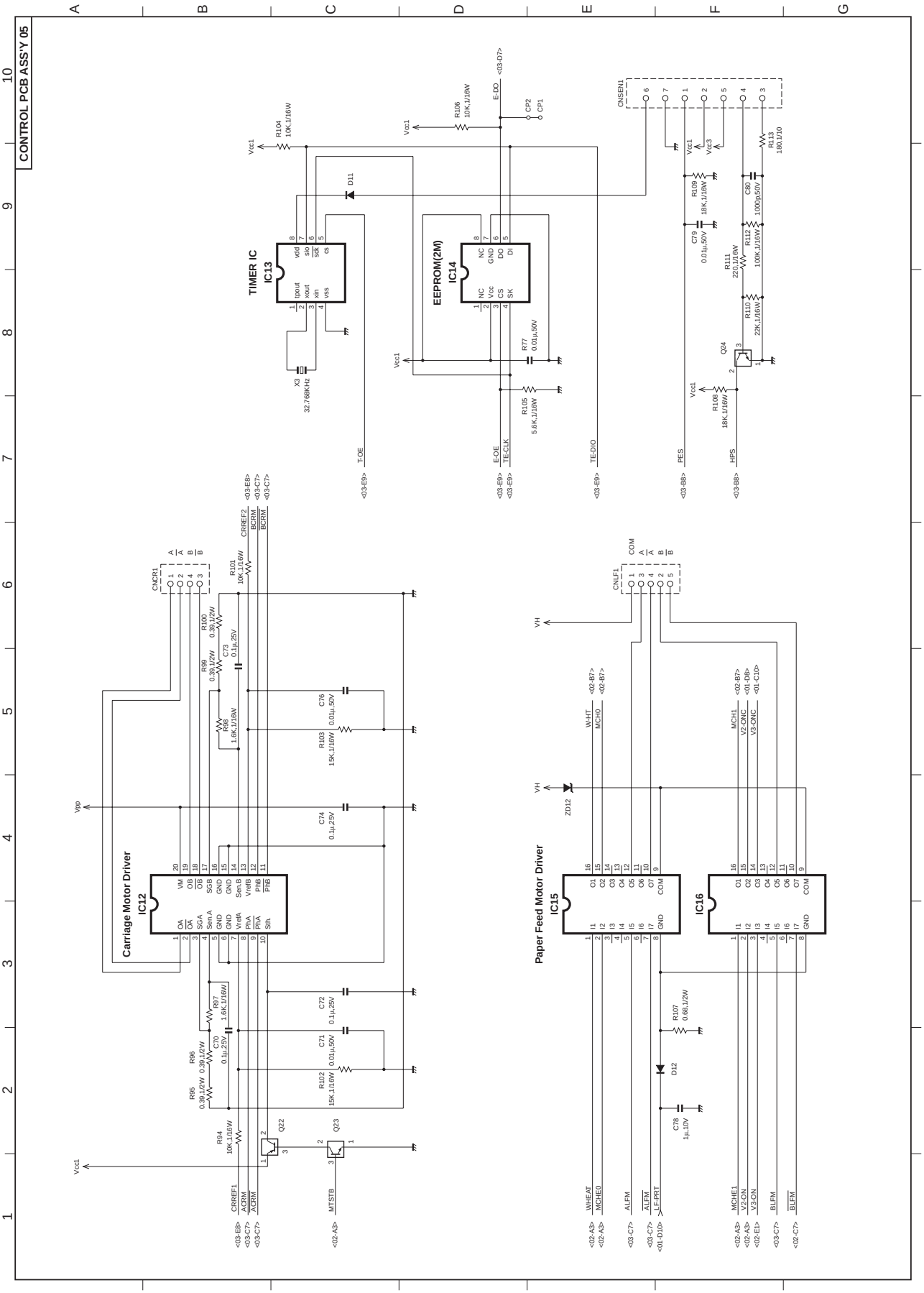
Control Board (Common to BJC-55/BJ M40)




CONTROL PCB ASS'Y 02
ASIC
IC6
IC7
IC7
CN1
Q20
X1
23.04MHz
X2
48MHz


CONTROL PCB ASS'Y 03
MPU
IC10
FLASH ROM
(BJC-55:8M, BJ M40:16M)
IC9
DRAM(4M)
IC8
IC11
CNSEN2
ZD8
R46
10K-1/16W
C33
0.01µ,50V
C25
0.01µ,50V
C26
0.01µ,50V
C27
0.01µ,50V
C37
100p,50V
C36
100p,50V
C35
100p,50V
C34
100p,50V
C24
1000p,50V
C23
1000p,50V
C22
1000p,50V
C21
1000p,50V
C98
0.1µ,25V
R91
300,1/16W
R84
10K-1/16W
R83
10K-1/16W
C30
0.01µ,50V
C46
0.01µ,50V
C48
0.01µ,50V
C44
0.01µ,50V
C43
0.01µ,50V
Vcc1
Vcc4
RD
WR
UW
RAS
LCAS
UCAS
OE
CE1
A <20..1>
D <15..0>
MD <15..0>
MA <9..0>
DCLEV
HDIS
BATLEV
HRANK
THBAT
TH
CHGLEV
ADBSEL
CONT


CONTROL PCB ASS'Y 04
USB Interface
Option ASF
IC17
IC18
IrDA Transceiver
CNUS1
CNOP1
PWR
GND
D-
D+
PLUG
PULLUP
USBD-
USBD+
BZOUT
PWLED
ERRLED
BATTLED
NMI
PWRON
CC-SW
RCV-SW
MODE
FRXD
TXD
RXD
CHGLEV
RXDO
TXDO
PES
OP-ON
TH
OP-Vcc
OP-VH
3VCC
3Vcc
Vcc1
Vcc3


CONTROL PCB ASS'Y 05
TIMER IC
IC13
EEPROM(2M)
IC14
Carriage Motor Driver
IC12
Paper Feed Motor Driver
IC15
IC16
CNCR1
CNLF1
CNSEN1
Vcc1
Vcc3
Vpp
VH
R104 10K,1/16W
R106 10K,1/16W
R105 5.6K,1/16W
R77 0.01µ,50V
R109 18K,1/16W
R110 22K,1/16W
R111 220,1/16W
R112 100K,1/16W
R113 180,1/10
C79 0.01µ,50V
C80 1000p,50V
R108 18K,1/16W
Q24
D11
X3 32.768KHz
R101 10K,1/16W
R100 0.39,1/2W
R99 0.39,1/2W
R98 1.6K,1/16W
R97 1.6K,1/16W
R96 0.39,1/2W
R95 0.39,1/2W
R94 10K,1/16W
C73 0.1µ,25V
C74 0.1µ,25V
C70 0.1µ,25V
C71 0.01µ,50V
C72 0.1µ,25V
C76 0.01µ,50V
R103 15K,1/16W
R102 15K,1/16W
Q22
Q23
ZD12
D12
R107 0.68,1/2W
C78 1µ,10V
T-OE
E-DO
E-OE
TE-CLK
TE-DIO
PES
HPS
MTSTB
W-HT
MCH0
MCH1
V2-ONC
V3-ONC
WHEAT
MCHE0
MCHE1
V2-ON
V3-ON
ALFM
BLFM
1F-PRT
CRREF1
CRREF2
ACRM
BCRM

BJC-50
BJC-50v
PARTS CATALOG

REVISION 0

Q30-2750-010	120V(CCSI)
Q30-2750-011	120V(CANADA)
Q30-2750-021	120V(UNIV)
Q30-2750-030	220V-240V(EUR)
Q30-2750-031	220V-240V(GER)
Q30-2750-032	220V-240V(FRN)
Q30-2750-033	220V-240V(HV)
Q30-2750-040	220V-240V(AUST)
Q30-2750-080	220V-240V(UK)
Q30-2751-035	(TWN, CHN)
Q30-2760-010	100V/50,60HZ(JPN)

Canon

MAR. 1998

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0398 SE 2.00-0

BJC-50
BJC-50v

PARTS CATALOG

Canon

Application

This manual has been issued by Canon Inc. for qualified person to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

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DTP System

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Parts layout illustrations and Logotypes were created using MACROMEDIA® FreeHand® 5.5J.
Pattern drawing were scaned by EPSON® GT-8000 scanner with Adobe® photoshop®.
Documents and page layouts were created using QuarkXpress® 3.3J.
Parts lists were created using Helix Tecnologies® Herix Xpress® and converted to EPS files.

I. CONTENTS

A. ILLUSTRATION INDEX
B. PARTS LAYOUT & PARTS LIST
C. SCREWS & WASHERS LIST
D. TOOL
E. NUMERICAL INDEX

II. ABOUT THIS MANUAL

A. ILLUSTRATION INDEX

For illustration index, the parts layout illustrations in this parts catalog are listed in abbreviated form in order of illustration number to identify the pages they appear on. To find an illustration of a part, see the ILLUSTRATION INDEX.

B. PARTS LAYOUT & PARTS LIST

Parts layout illustration

a) Parts search

Find a part from the parts layout illustration and find its key number from the parts list to identify the part number and name. For screws, nuts, washers, lock washers, pins, spacers, see SCREWS &WASHERS LIST.

Note: If parts have the same or similar shape but different specifications, their key number is assigned to several part numbers and names in the parts list.

b) Parts replacement procedure

To replace parts, the parts layout illustrations have figure numbers according to the disassembly procedure of the product. The parts that require careful work are shown the illustration.

Parts list

a) FIGURE & KEY No.

The FIGURE & KEY No. column corresponds to the key numbers assigned to the parts in the parts layout illustration.
It also corresponds to the part locations printed on the PC board.

b) PART NUMBER

The PART NUMBER column gives the part numbers corresponding to the key numbers. To order a part, indicate the part number clearly.
Note: Parts marked NPN are not service parts.

c) RANK

The service parts with N in the RANK column are order parts.

d) QTY

The QTY column gives the number of parts in the corresponding components layout illustration.

e) DESCRIPTION

The DESCRIPTION column gives the part names in English.
To order a part, indicate the part name, too.

C. SCREWS & WASHERS LIST

This is a list of screws, nuts, washers, lock washers, pins, and spacers.
The QTY column does not give the number of parts used.

D. TOOL LIST

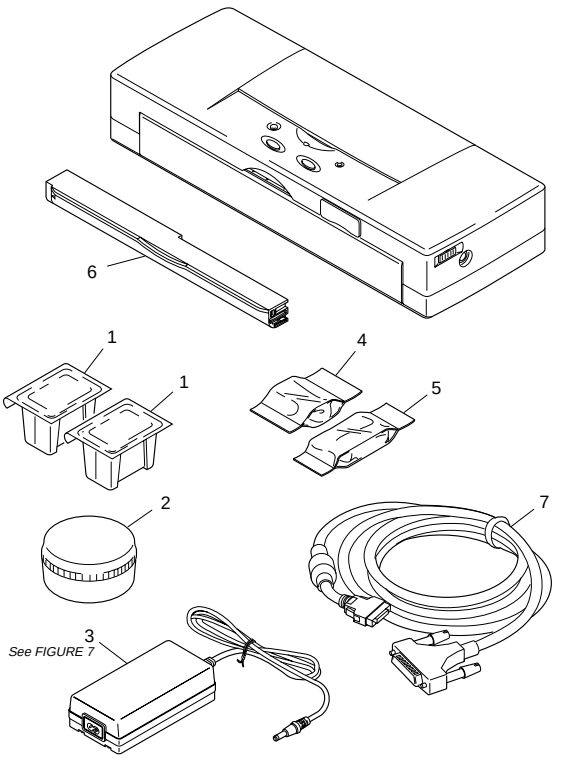
This is a list of tools used for servicing products.

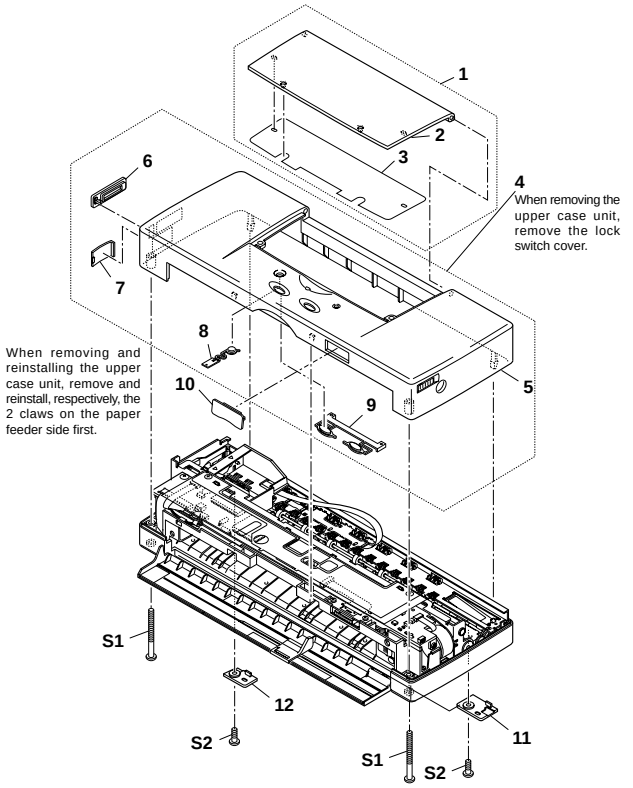
E. NUMERICAL INDEX

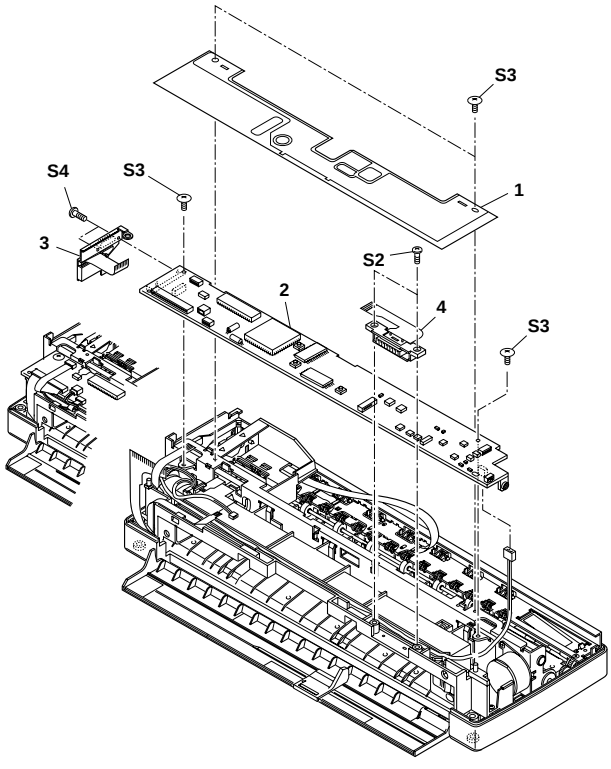
All the parts listed in this parts catalog are arranged in order of part number. You can identify part locations and names from the NUMERICAL INDEX.

A. ILLUSTRATION INDEX

FIGURE 1	PRINTER SET	See Page B - 1	
FIGURE 2	UPPER CASE	See Page B - 3	
FIGURE 3	CONTROL BOARD	See Page B - 5	
FIGURE 4	PRINT UNIT & LOWER CASE UNIT	See Page B - 7	







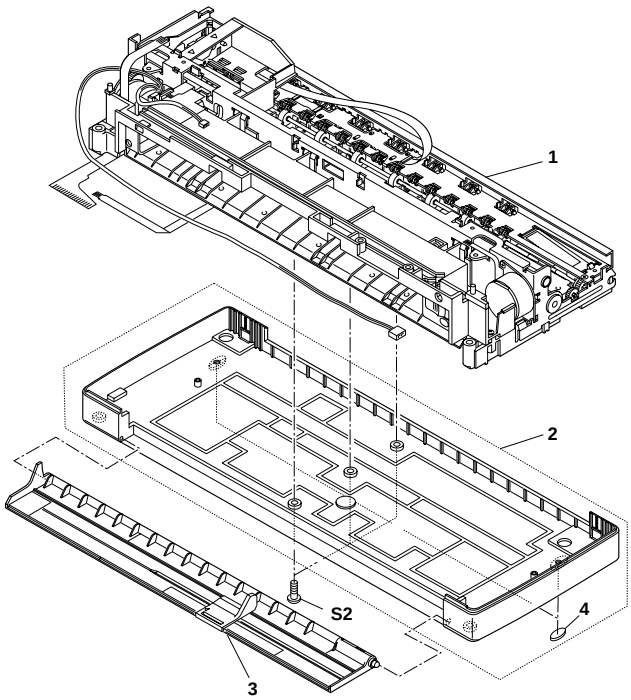


FIGURE 5 PRINTER BASE UNIT	See Page B - 9

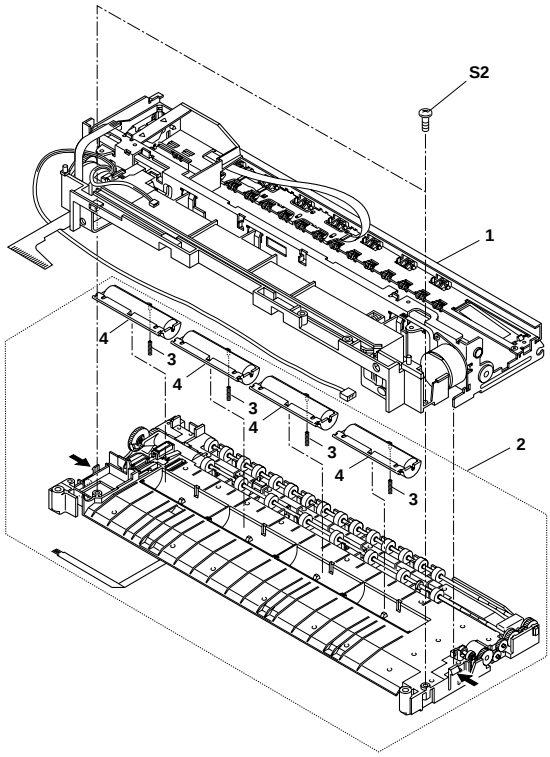
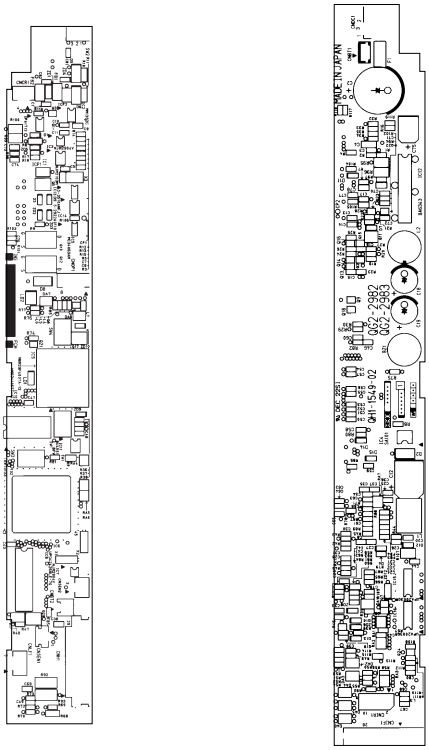


FIGURE 6 CONTROL BOARD COMPONENT	See Page B - 11



TOP VIEW BOTTOM VIEW

FIGURE 7 AC ADAPTER	See Page B - 19

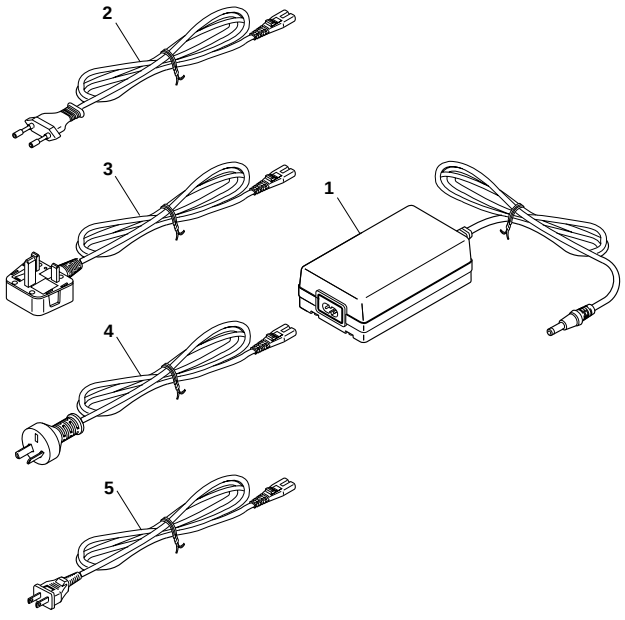
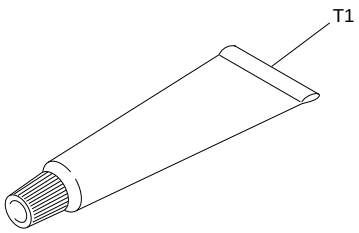


FIGURE 8 TOOL	See Page D - 1



B. PARTS LAYOUT & PARTS LIST

FIGURE 1 PRINTER SET

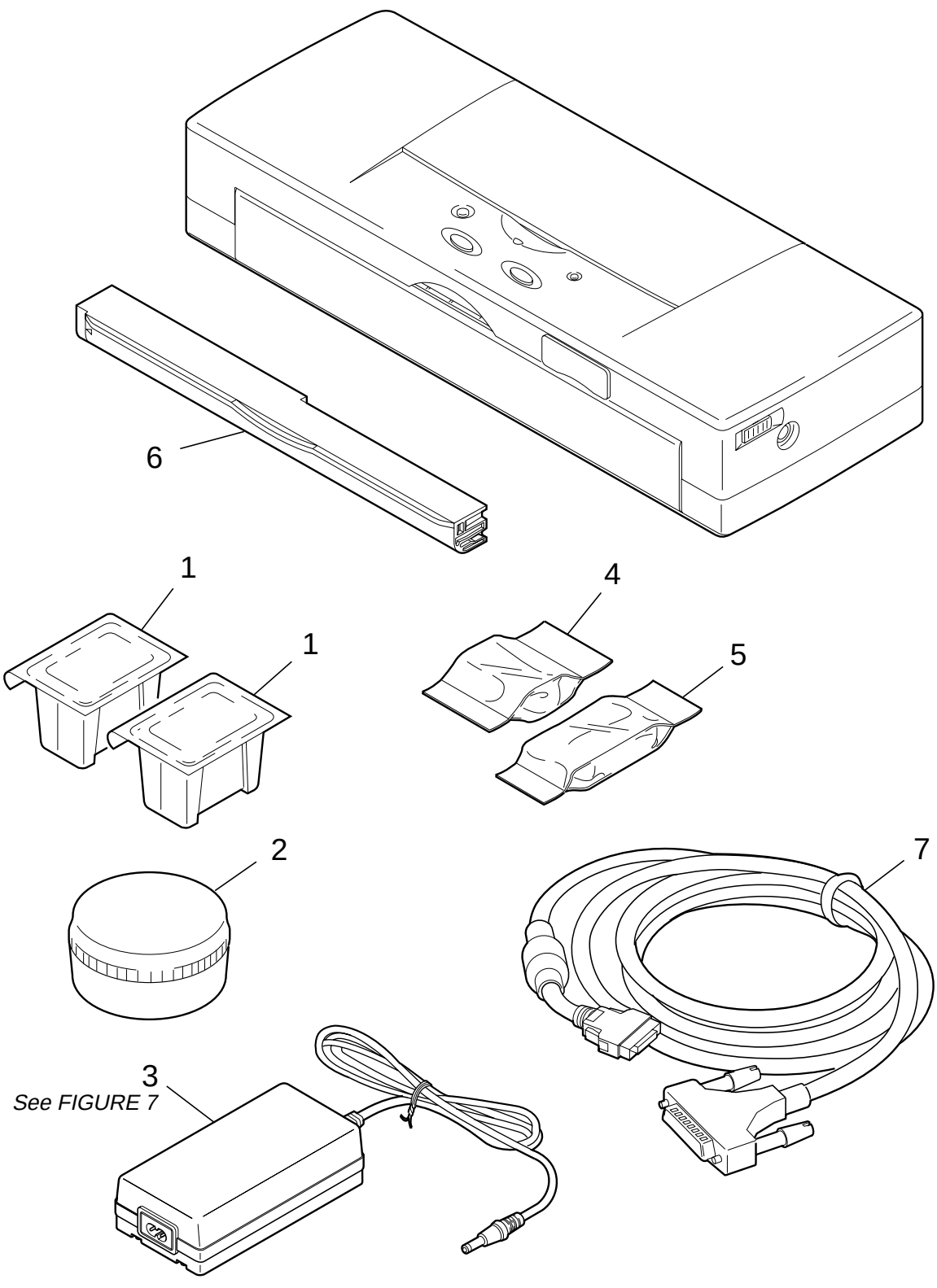


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
1- 1	NPN		1	BLACK BJ CARTRIDGE PACK	CONSUMABLES
	NPN		1	COLOR BJ CARTRIDGE PACK	CONSUMABLES
2	NPN		1	CARTRIDGE CONTAINER	OPTION
3	QH3-3349-000	N	1	AC ADAPTOR: 100V~240V 50/60HZ	OUTPUT 13VDC, 1.8A
4	NPN		1	COLOR INK CARTRIDGE	FOR COLOR BJ CARTRIDGE
5	NPN		1	BLACK INK CARTRIDGE	FOR COLOR BJ CARTRIDGE
6	NPN		1	LITHIUM ION BATTERY	
7	QH8-0080-000		1	I/F CABLE	

FIGURE 2 UPPER CASE

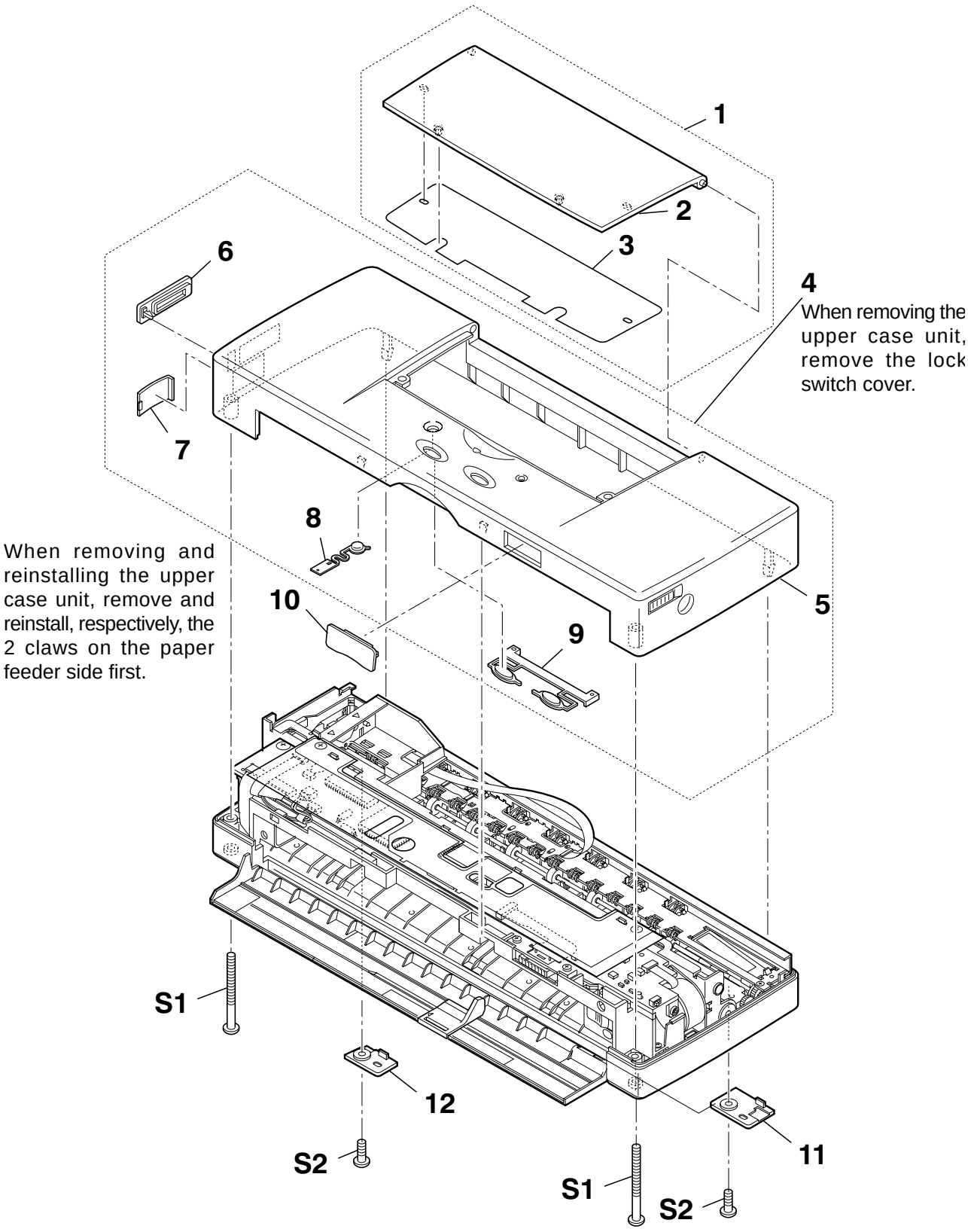


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
2- 1	QG5-1125-000		1	HEAD COVER UNIT	FOR BJC-50
	QG5-1129-000		1	HEAD COVER UNIT	FOR BJC-50V
2	QB1-3225-000		1	COVER, HEAD	FOR BJC-50
	QB1-3232-000		1	COVER, HEAD	FOR BJC-50V
3	QB1-3226-000		1	FILM, INSTRUCTION	FOR BJC-50
	QB1-3227-000		1	FILM, INSTRUCTION	FOR BJC-50V
4	QG5-1124-000		1	UPPER CASE UNIT	FOR BJC-50
	QG5-1128-000		1	UPPER CASE UNIT	FOR BJC-50V
5	QB1-3218-000		1	UPPER CASE	FOR BJC-50
	QB1-3219-000		1	UPPER CASE	FOR BJC-50V
6	QB1-3224-000		1	COVER, CONNECTOR	
7	QB1-3223-000		1	FILTER, IRDA	
8	QB1-3221-000		1	SWITCH 2	
9	QB1-3220-000		1	SWITCH 1	
10	QB1-3234-000		1	COVER, ASF	
11	QB1-3190-000		1	STOPPER, BIG	
12	QB1-3191-000		1	STOPPER, SMALL	

FIGURE 3 CONTROL BOARD

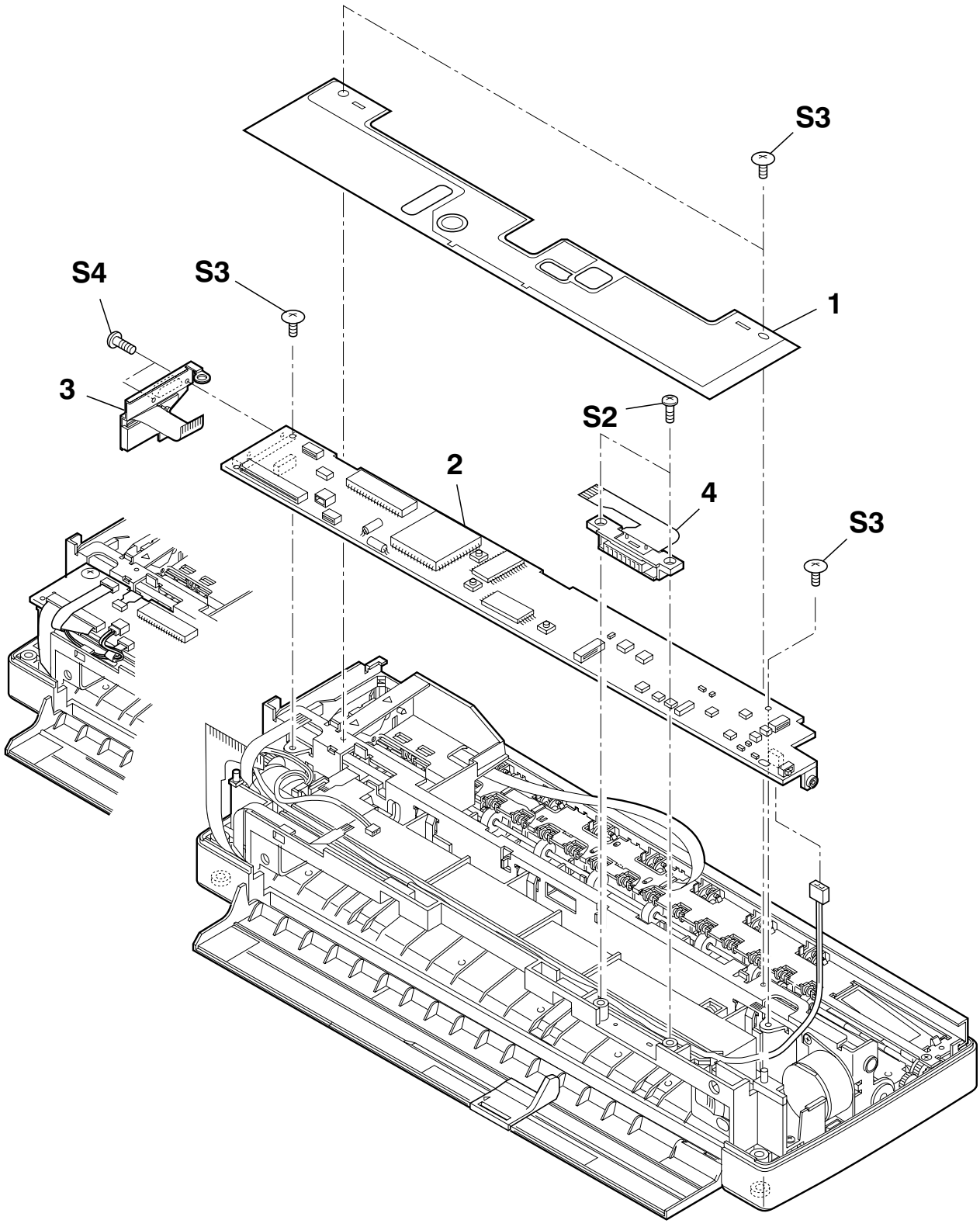


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
3- 1	QB1-3193-000		1	FILM, PROTECTION	
	QG2-2982-000		1	CONTROL PCB ASS'Y	FOR BJC-50
	QG2-2983-000		1	CONTROL PCB AASS'Y	FOR BJC-50V
	QG2-2981-000		1	IRDA UNIT	
	QH7-8947-000		1	CONNECTOR, ASF	

FIGURE 4 PRINT UNIT & LOWER CASE UNIT

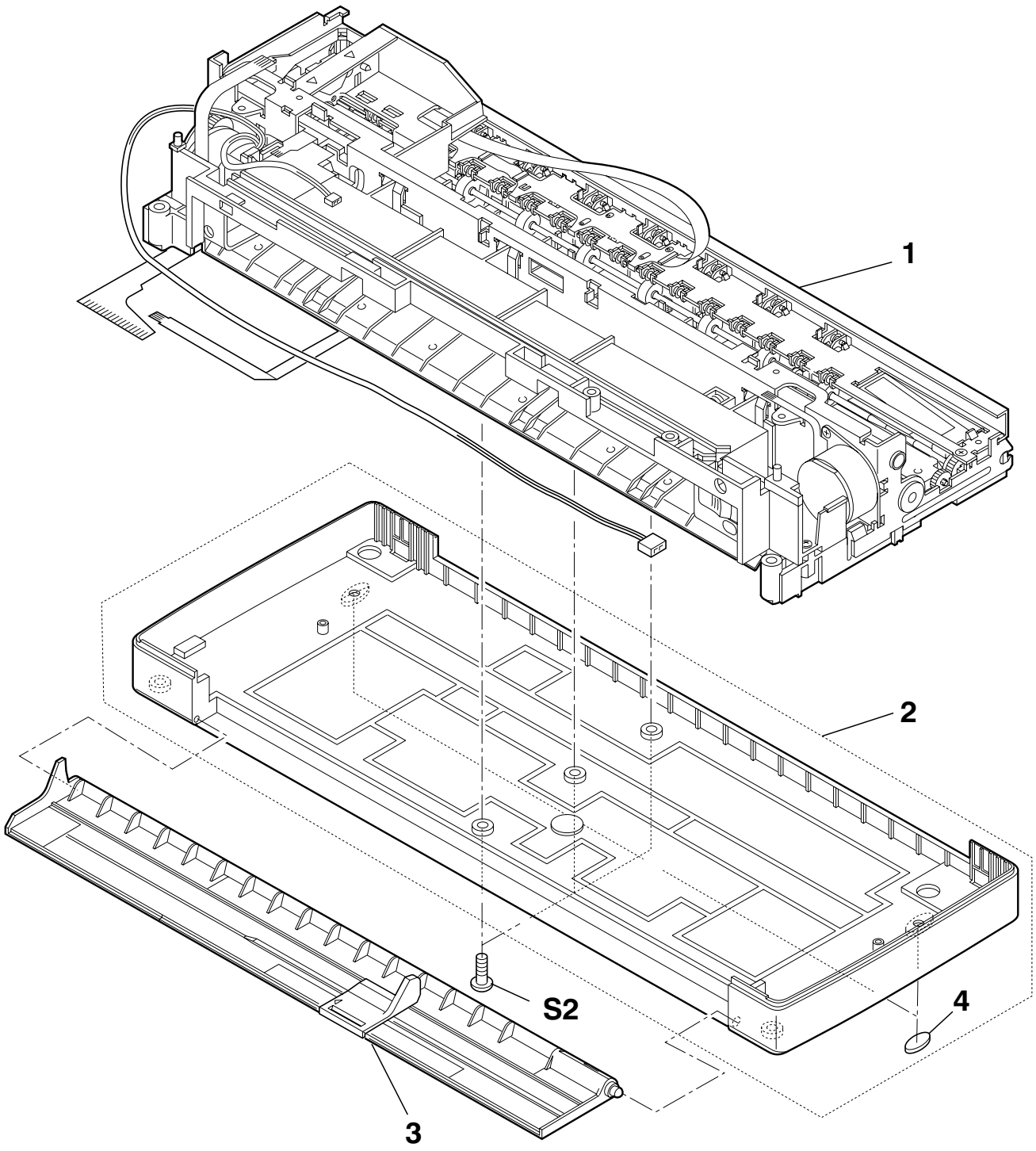


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
4- 1	QG5-1117-000		1	PRINT UNIT	FOR BJC-50
	QG5-1132-000		1	PRINT UNIT	FOR BJC-50V
2	QF5-0373-000		1	LOWER CASE UNIT	
3	QG5-1126-000		1	TRAY UNIT	
4	QB1-1135-000		2	FOOT, RUBBER (B)	

FIGURE 5 PRINTER BASE UNIT

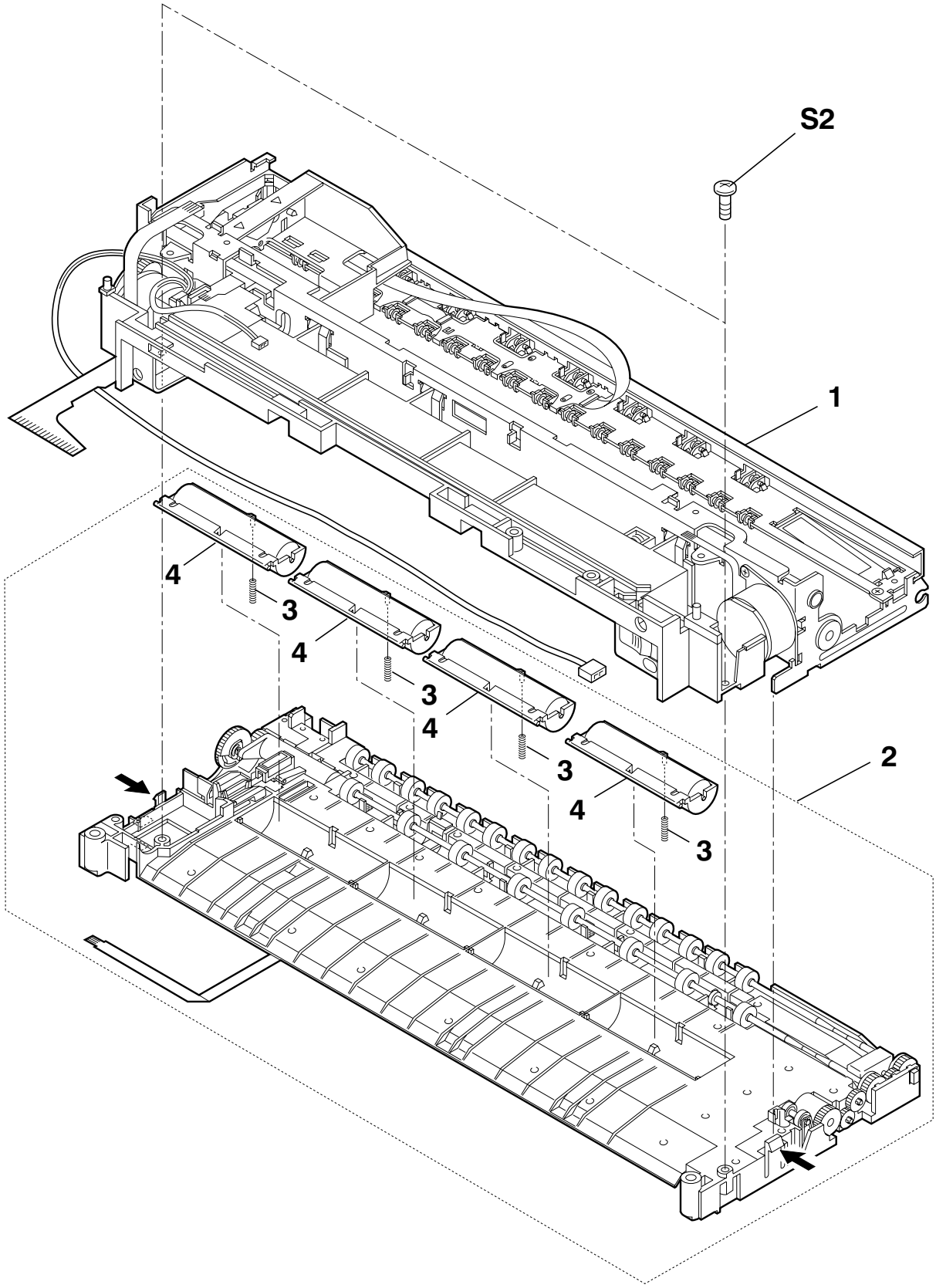
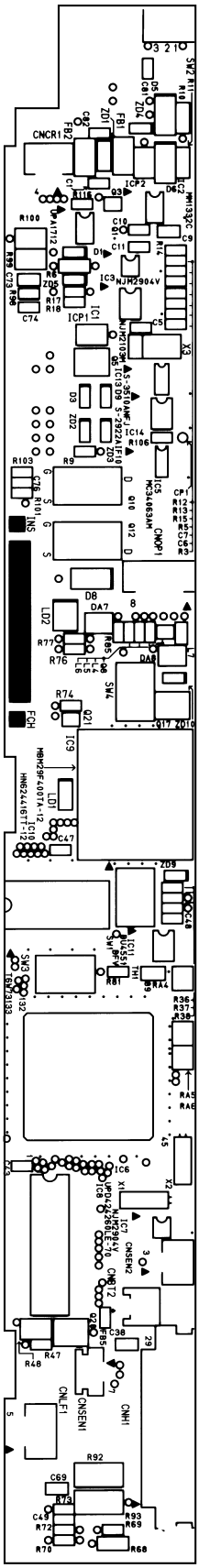
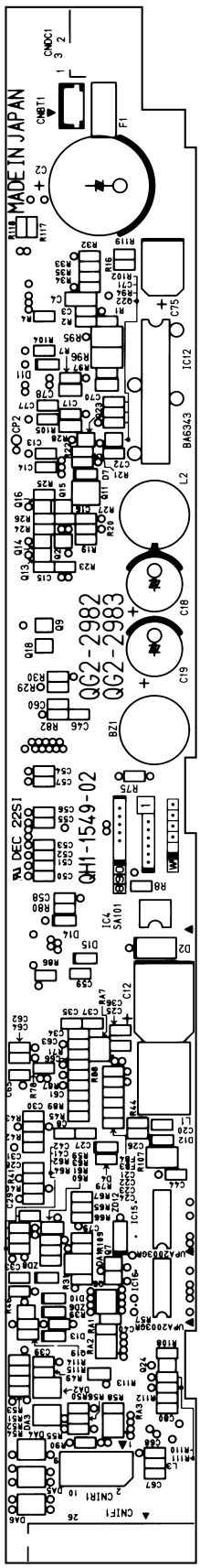


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
5- 1	NPN		1	CHASSIS UNIT	
2	QG5-1122-000		1	PRINTER BASE UNIT	
3	QG5-1130-000		4	PINCH ROLLER UNIT	
4	QB1-3207-000		4	SPRING, COIL	

FIGURE 6 CONTROL BOARD COMPONENT





TOP VIEW **BOTTOM VIEW**

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
6 - BZ 1	WR1-5059-000	N	1	BEEPER: CD11PA-Z	
C 1	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 2	VC7-9360-228	N	1	CAPACITOR, AL-EL: 2200UF 25V	
C 3	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 4	VC9-5530-000	N	1	CAPACITOR, CHIP, CERAMIC: 2.2UF 16V	
C 5	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 6	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 7	VW4-1234-101	N	1	CAPACITOR,CHIP,CERAMIC: 100 PF 50V	
C 8	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 9	VC8-7370-225	N	1	CAPACITOR, CHIP, CERAMIC: 2.2UF 16V	
C 10	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 11	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 12	QH8-0007-000	N	1	CAPACITOR, AL-EL: 1000UF 6.3V	
C 13	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 14	VW4-1234-331	N	1	CAPACITOR, CERAMIC: 330PF 50V	
C 15	VW4-1835-332	N	1	CAPACITOR, CERAMIC: 3300PF 50V	
C 16	VW4-1835-332	N	1	CAPACITOR, CERAMIC: 3300PF 50V	
C 17	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 18	VC7-5700-477	N	1	CAPACITOR, AL-EL: 470UF 35V	
C 19	VC7-5700-477	N	1	CAPACITOR, AL-EL: 470UF 35V	
C 20	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 21	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 22	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 23	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 24	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 25	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 26	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 27	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 28	VW4-1232-609	N	1	CAPACITOR,CERAMIC: 6PF 50V	
C 29	VW4-1232-609	N	1	CAPACITOR,CERAMIC: 6PF 50V	
C 30	VW4-1232-809	N	1	CAPACITOR,CERAMIC: 8PF 50V	
C 31	VW4-1232-809	N	1	CAPACITOR,CERAMIC: 8PF 50V	
C 33	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 34	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 35	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 36	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 37	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 38	VC8-7380-105	N	1	CAPACITOR, CHIP, CERAMIC: 1.0UF 50V	
C 42	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 43	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 44	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 46	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 47	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 48	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 49	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
C 50	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 51	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 52	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 53	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 54	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 55	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 56	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 57	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 58	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 59	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 60	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 61	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 62	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 63	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 64	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 65	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 66	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 67	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 68	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 69	VC9-5531-000	N	1	CAPACITOR, CHIP, CERAMIC: 4.7UF 10V	
C 70	VW4-2825-104	N	1	CAPACITOR,CHIP,CERAMIC: 0.1UF 25V	
C 71	VC8-1420-103	N	1	CAPACITOR,CHIP,CERAMIC: 0.01UF 50V	
C 72	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 73	VW4-2825-104	N	1	CAPACITOR,CHIP,CERAMIC: 0.1UF 25V	
C 74	VW4-1027-104	N	1	CAPACITOR, CERAMIC: 0.1UF 25V	
C 75	VC7-6890-336	N	1	CAPACITOR, AL-EL: 33UF 25V	
C 76	VC8-1420-103	N	1	CAPACITOR,CHIP,CERAMIC: 0.01UF 50V	
C 77	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 78	VC8-7390-105	N	1	CAPACITOR, CHIP, CERAMIC: 1.0UF 10V	
C 79	VW4-1037-103	N	1	CAPACITOR,ML,CERAMIC:0.01UF 50V	
C 80	VW4-1835-102	N	1	CAPACITOR, CERAMIC: 1000PF 50V	
C 81	VC8-1420-103	N	1	CAPACITOR,CHIP,CERAMIC: 0.01UF 50V	
C 82	VC8-1420-103	N	1	CAPACITOR,CHIP,CERAMIC: 0.01UF 50V	
CNBT 1	VS3-0171-002	N	1	CONNECTOR, BATTERY, 2P	
CNBT 2	VS1-5938-002	N	1	CONNECTOR, 2P	
CNCR 1	VS1-6354-004	N	1	CONNECTOR, 4P	
CNDC 1	WS1-5527-000	N	1	DC CONNECTOR, LGP6531-0800	
CNH 1	VS1-5117-029	N	1	CONNECTOR, 29P	
CNIF 1	WS1-5687-000	N	1	CONNECTOR, 26P	
CNIR 1	VS1-6371-010	N	1	CONNECTOR, 10P	
CNLF 1	VS1-6355-005	N	1	CONNECTOR, 5P	
CNOP 1	VS1-6355-008	N	1	CONNECTOR, 8P	
CNSEN 1	VS1-6356-007	N	1	CONNECTOR, 7P	
CNSEN 2	VS1-6355-003	N	1	CONNECTOR, 3P	
D 1	WA1-5403-000	N	1	DIODE: 1SS355	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
D 2	WA1-5803-000	N	1	DIODE: D1FS4A	
D 3	WA1-5403-000	N	1	DIODE: 1SS355	
D 4	WA1-5403-000	N	1	DIODE: 1SS355	
D 5	WA1-6124-000	N	1	DIODE: RB051L-40	
D 6	WA1-5803-000	N	1	DIODE: D1FS4A	
D 7	WA1-5403-000	N	1	DIODE: 1SS355	
D 8	WA1-6124-000	N	1	DIODE: RB051L-40	
D 9	WA1-5403-000	N	1	DIODE: 1SS355	
D 10	WA1-5403-000	N	1	DIODE: 1SS355	
D 11	WA1-5403-000	N	1	DIODE: 1SS355	
D 12	WA1-5403-000	N	1	DIODE: 1SS355	
D 13	WA1-5403-000	N	1	DIODE: 1SS355	
D 14	WA1-5403-000	N	1	DIODE: 1SS355	
D 15	WA1-5403-000	N	1	DIODE: 1SS355	
DA 1	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 2	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 3	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 4	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 5	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 6	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 7	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DA 8	WA1-5993-000	N	1	DIODE ARRAY: HZM6.8FA	
DZ 1	WA1-6184-000	N	1	DIODE: RLZ20B	
DZ 2	WA1-6175-000	N	1	DIODE: HZU6.2B2	
DZ 3	WA1-6181-000	N	1	DIODE: HZU27B	
DZ 4	WA1-6179-000	N	1	DIODE: HZU16B1	
DZ 5	WA1-6177-000	N	1	DIODE: HZU15B2	
DZ 6	WA1-6179-000	N	1	DIODE: HZU16B1	
DZ 8	WA1-6176-000	N	1	DIODE: HZU6.8B	
DZ 9	WA1-6177-000	N	1	DIODE: HZU15B2	
DZ 10	WA1-6182-000	N	1	DIODE: HZU30B	
DZ 12	WA1-6183-000	N	1	DIODE: RLZ15B	
F 1	VD7-1764-001		1	FUSE, 4.0A 48V, SLM40	
FB 1	WE8-5423-000	N	1	FERRITE, BEADS: FBM4532HM132	
FB 2	WE8-5423-000	N	1	FERRITE, BEADS: FBM4532HM132	
FB 3	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
FB 4	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
FB 5	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
IC 1	WA4-6615-000	N	1	IC, NJM2103M, RESET	
IC 2	WA4-7043-000	N	1	IC, MM1332C, DRIVER	
IC 3	WA4-5978-000	N	1	IC, NJM2904V, OP AMP	
IC 4	WA4-6373-000	N	1	IC, SAI01, REGULATOR	
IC 5	WA4-6372-000	N	1	IC, NJM2360AM, REGULATOR	
IC 6	QH7-8905-000		1	IC, T6W73, ASIC	
IC 7	WA4-5978-000	N	1	IC, NJM2904V, OP AMP	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
IC 8	WA7-0287-000	N	1	IC, GM71C4260CJ-60, DRAM	
IC 9	QH8-0004-000		1	IC, MBM29F400TC-70PFTN, FLASH-ROM	FOR BJC-50
	QH8-0088-000		1	IC, TC58F401FT-90, FLASH-ROM	FOR BJC-50V
IC 10	QH7-8964-000		1	IC, TC5316200CFT-EC07, MASKED-ROM	FOR BJC-50V
	QH7-8968-000		1	IC,KM23C8100DT12KFX3G7T,MASKED-ROM	FOR BJC-50
IC 11	WA4-7044-000		1	IC, BU4551BFV, D/D CONVERTER	
IC 12	WA4-6654-000		1	IC, M54676P, DRIVER	
IC 13	WA3-8685-000	N	1	IC, S-3510ANFJ, TIMER	
IC 14	WA3-7960-000	N	1	IC, NM93C56TEM8, EEP-ROM	
IC 15	WA2-6489-000	N	1	TRANSISTOR ARRAY; UPA2003GR	
IC 16	WA2-6489-000	N	1	TRANSISTOR ARRAY; UPA2003GR	
ICP 1	VD7-1567-000	N	1	IC PROTECTOR, ICP-S0.7, 0.7A	
ICP 2	VD7-1565-000	N	1	IC PROTECTOR, ICP-S0.5, 0.5A	
L 1	WE2-5243-000	N	1	INDUCTOR: N08DPA221K	
L 2	WE2-5207-000	N	1	COIL: SBCP-13101HC	
L 3	VV1-8000-000	N	1	JUMPER	
L 4	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
L 5	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
L 6	WE8-5429-000	N	1	CHIP, FERRITE: BK1608LM182	
L 7	WE8-5493-000	N	1	FERRITE, BEADS: BK2125HS750	
LD 1	WG1-5565-000	N	1	LED: SEC1403C GREEN	
LD 2	WG2-5157-000	N	1	LED: SEC2494C	
Q 1	WA2-6514-000	N	1	TRANSISTOR: SI4435DY (FET)	
Q 2	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 3	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 5	WA2-6168-000	N	1	TRANSISTOR: 2SK2103 (FET)	
Q 6	WA2-6492-000	N	1	TRANSISTOR: DTA113ZE (PNP)	
Q 7	WA2-5306-000	N	1	TRANSISTOR: DTA143EE	
Q 8	WA2-6492-000	N	1	TRANSISTOR: DTA113ZE (PNP)	
Q 9	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 10	WA2-6241-000	N	1	TRANSISTOR: 2SJ417TL (FET)	
Q 11	WA2-0707-000	N	1	TRANSISTOR: 2SA1298Y	
Q 12	WA2-6240-000	N	1	TRANSISTOR: 2SK2018-01S (FET)	
Q 13	WA2-5142-000	N	1	TRANSISTOR: 2SC4617	
Q 14	WA2-5306-000	N	1	TRANSISTOR: DTA143EE	
Q 15	WA2-5142-000	N	1	TRANSISTOR: 2SC4617	
Q 16	WA2-5306-000	N	1	TRANSISTOR: DTA143EE	
Q 17	WA2-6491-000	N	1	TRANSISTOR: 2SJ355 (FET)	
Q 18	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 19	WA2-5142-000	N	1	TRANSISTOR: 2SC4617	
Q 20	WA2-6494-000	N	1	TRANSISTOR: 2SA1900R (PNP)	
Q 21	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 22	WA2-5306-000	N	1	TRANSISTOR: DTA143EE	
Q 23	WA2-5449-000	N	1	TRANSISTOR: DTC143EE	
Q 24	WA2-5142-000	N	1	TRANSISTOR: 2SC4617	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
R 1	VR7-1810-223	N	1	RESISTOR,CHIP,METAL: 22K OHM 1/16W	
R 2	VR7-1810-202	N	1	RESISTOR,CHIP,METAL: 2K OHM 1/16W	
R 3	VV1-8163-184	N	1	RESISTOR, CHIP: 180K OHM 1/16W	
R 4	VV1-8163-333	N	1	RESISTOR, CHIP: 33K OHM 1/16W	
R 5	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 6	VV1-6148-221	N	1	RESISTOR, METAL: 220 OHM 1/4W	
R 7	VV1-8165-105	N	1	RESISTOR, CHIP: 1M OHM 1/16W	
R 8	VR7-1810-101	N	1	RESISTOR,CHIP,METAL: 100 OHM 1/16W	
R 9	VV1-8165-472	N	1	RESISTOR, CHIP: 4.7K OHM 1/16W	
R 10	VR7-7420-138	N	1	RESISTOR,CHIP,CARBON: 0.13 OHM 1/4W	
R 11	VR7-7420-138	N	1	RESISTOR,CHIP,CARBON: 0.13 OHM 1/4W	
R 12	VR7-1810-752	N	1	RESISTOR,CHIP,METAL: 7.5K OHM 1/16W	
R 13	VR7-1810-752	N	1	RESISTOR,CHIP,METAL: 7.5K OHM 1/16W	
R 14	VR7-2370-304	N	1	RESISTOR,CHIP,METAL: 300K OHM 1/16W	
R 15	VR7-2370-304	N	1	RESISTOR,CHIP,METAL: 300K OHM 1/16W	
R 16	VR7-1810-202	N	1	RESISTOR,CHIP,METAL: 2K OHM 1/16W	
R 17	VR7-3782-322	N	1	RESISTOR,CHIP,METAL:23.2K OHM 1/16W	
R 18	VR7-1810-103	N	1	RESISTOR,CHIP,METAL: 10K OHM 1/16W	
R 19	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 20	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 21	VV1-8165-201	N	1	RESISTOR, CHIP: 200 OHM 1/16	
R 22	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 23	VV1-8165-334	N	1	RESISTOR,CHIP,METAL: 330K OHM 1/16W	
R 24	VR7-2370-683	N	1	RESISTOR,CHIP,METAL: 68K OHM 1/16W	
R 25	VR7-1810-153	N	1	RESISTOR,CHIP,METAL: 15K OHM 1/16W	
R 26	VR7-1810-821	N	1	RESISTOR,CHIP,METAL: 820 OHM 1/16W	
R 27	VV1-8165-334	N	1	RESISTOR,CHIP,METAL: 330K OHM 1/16W	
R 28	VV1-7115-510	N	1	RESISTOR, CHIP: 51 OHM 1/10W	
R 29	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 30	VV1-8165-272	N	1	RESISTOR, CHIP: 2.7K OHM 1/16W	
R 31	VR7-1810-752	N	1	RESISTOR,CHIP,METAL: 7.5K OHM 1/16W	
R 32	VV1-8165-104	N	1	RESISTOR, CHIP: 100K OHM 1/16W	
R 33	VV1-8165-473	N	1	RESISTOR, CHIP: 47K OHM 1/16W	
R 34	VV1-8165-223	N	1	RESISTOR, CHIP: 22K OHM 1/16W	
R 35	VV1-8165-473	N	1	RESISTOR, CHIP: 47K OHM 1/16W	
R 36	VR7-1810-202	N	1	RESISTOR,CHIP,METAL: 2K OHM 1/16W	
R 37	VR7-3782-322	N	1	RESISTOR,CHIP,METAL:23.2K OHM 1/16W	
R 38	VR7-1810-103	N	1	RESISTOR,CHIP,METAL: 10K OHM 1/16W	
R 39	VV1-8165-102	N	1	RESISTOR,CHIP: 1K OHM 1/16W	
R 40	VV1-8165-271	N	1	RESISTOR,CHIP,METAL: 270 OHM 1/16W	
R 41	VV1-8165-105	N	1	RESISTOR,CHIP: 1M OHM 1/16W	
R 42	VV1-8165-221	N	1	RESISTOR,CHIP: 220 OHM 1/16W	
R 43	VV1-8165-105	N	1	RESISTOR,CHIP: 1M OHM 1/16W	
R 44	VV1-8165-473	N	1	RESISTOR,CHIP: 47K OHM 1/16W	
R 45	VV1-8165-103	N	1	RESISTOR,CHIP: 10K OHM 1/16W	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
R 46	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 47	VV1-8165-272	N	1	RESISTOR, CHIP: 2.7K OHM 1/16W	
R 48	VV1-0145-392	N	1	RESISTOR, CHIP: 3.9K OHM 1/4W	
R 49	VR7-1810-102	N	1	RESISTOR,CHIP,METAL: 1K OHM 1/16W	
R 50	VV1-8165-334	N	1	RESISTOR,CHIP,METAL: 330K OHM 1/16W	
R 51	VR7-1810-103	N	1	RESISTOR,CHIP,METAL: 10K OHM 1/16W	
R 52	VR7-1810-113	N	1	RESISTOR, CHIP: 11K OHM 1/16W	
R 53	VR7-1810-223	N	1	RESISTOR,CHIP,METAL: 22K OHM 1/16W	
R 54	VR7-1810-203	N	1	RESISTOR, METAL: 20K OHM 1/16W	
R 55	VV1-8165-101	N	1	RESISTOR, CHIP: 100 OHM 1/16W	
R 56	VV1-8165-101	N	1	RESISTOR, CHIP: 100 OHM 1/16W	
R 57	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 58	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 59	VR7-1830-474	N	1	RESISTOR,CHIP,METAL: 470K OHM 1/10W	
R 60	VR7-1810-333	N	1	RESISTOR,CHIP,METAL: 33K OHM 1/16W	
R 61	VR7-1810-123	N	1	RESISTOR,CHIP,METAL: 12K OHM 1/16W	
R 62	VR7-2370-104	N	1	RESISTOR,CHIP,METAL: 100K OHM 1/16W	
R 63	VR7-2370-104	N	1	RESISTOR,CHIP,METAL: 100K OHM 1/16W	
R 64	VR7-1810-101	N	1	RESISTOR,CHIP,METAL: 100 OHM 1/16W	
R 65	VR7-2370-184	N	1	RESISTOR,CHIP,METAL: 180K OHM 1/16W	
R 66	VR7-1810-752	N	1	RESISTOR,CHIP,METAL: 7.5K OHM 1/16W	
R 67	VR7-1810-102	N	1	RESISTOR,CHIP,METAL: 1K OHM 1/16W	
R 68	VV1-1185-391	N	1	RESISTOR,CHIP,METAL: 390 OHM 1/8W	
R 69	VV1-8165-562	N	1	RESISTOR, CHIP: 5.6K OHM 1/16W	
R 70	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 71	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 72	VV1-8165-101	N	1	RESISTOR, CHIP: 100 OHM 1/16W	
R 73	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 74	VV1-8165-152	N	1	RESISTOR, CHIP: 1.5K OHM 1/16W	
R 75	VV1-8165-301	N	1	RESISTOR, CHIP: 300 OHM 1/16W	
R 76	VV1-8165-301	N	1	RESISTOR, CHIP: 300 OHM 1/16W	
R 77	VV1-8165-301	N	1	RESISTOR, CHIP: 300 OHM 1/16W	
R 78	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 79	VV1-8165-473	N	1	RESISTOR, CHIP: 47K OHM 1/16W	
R 80	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 81	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 82	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R 85	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 86	VR7-2370-473	N	1	RESISTOR,CHIP,METAL: 47K OHM 1/16W	
R 87	VV1-8165-101	N	1	RESISTOR, CHIP: 100 OHM 1/16W	
R 88	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 89	VV1-8165-102	N	1	RESISTOR, CHIP: 1K OHM 1/16W	
R 90	VV1-8165-680	N	1	RESISTOR, CHIP: 68 OHM 1/16W	
R 92	VR7-2040-120	N	1	RESISTOR, CHIP: 12 OHM 1W	
R 93	VR7-2040-120	N	1	RESISTOR, CHIP: 12 OHM 1W	

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
R 94	VR7-1810-103	N	1	RESISTOR,CHIP,METAL: 10K OHM 1/16W	
R 95	VR9-5498-000	N	1	RESISTOR,CHIP,METAL: 0.39 OHM 1/2W	
R 96	VR9-5498-000	N	1	RESISTOR,CHIP,METAL: 0.39 OHM 1/2W	
R 97	VR7-1810-162	N	1	RESISTOR,CHIP,METAL: 1.6K OHM 1/16W	
R 98	VR7-1810-162	N	1	RESISTOR,CHIP,METAL: 1.6K OHM 1/16W	
R 99	VR9-5498-000	N	1	RESISTOR,CHIP,METAL: 0.39 OHM 1/2W	
R100	VR9-5498-000	N	1	RESISTOR,CHIP,METAL: 0.39 OHM 1/2W	
R101	VR7-1810-103	N	1	RESISTOR,CHIP,METAL: 10K OHM 1/16W	
R102	VR7-1810-153	N	1	RESISTOR,CHIP,METAL: 15K OHM 1/16W	
R103	VR7-1810-153	N	1	RESISTOR,CHIP,METAL: 15K OHM 1/16W	
R104	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R105	VV1-8165-562	N	1	RESISTOR, CHIP: 5.6K OHM 1/16W	
R106	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R107	VR9-5499-000	N	1	RESISTOR,CHIP,METAL: 0.68 OHM 1/2W	
R108	VV1-8165-183	N	1	RESISTOR, CHIP: 68K OHM 1/16W	
R109	VV1-8165-183	N	1	RESISTOR, CHIP: 68K OHM 1/16W	
R110	VV1-8165-223	N	1	RESISTOR, CHIP: 22K OHM 1/16W	
R111	VV1-8165-221	N	1	RESISTOR, CHIP: 220 OHM 1/16W	
R112	VV1-8165-104	N	1	RESISTOR, CHIP: 100K OHM 1/16W	
R113	VV1-7115-181	N	1	RESISTOR, CHIP: 180 OHM 1/10W	
R114	VV1-8165-222	N	1	RESISTOR,CHIP: 2.2K OHM 1/16W	
R115	VV1-8165-152	N	1	RESISTOR, CHIP: 1.5K OHM 1/16W	
R116	VV1-8165-103	N	1	RESISTOR, CHIP: 10K OHM 1/16W	
R117	VV1-8000-000	N	1	JUMPER	
R119	VV1-8165-473	N	1	RESISTOR,CHIP: 47K OHM 1/16W	
RA 1	VR7-3260-101	N	1	RESISTOR,CHIP,ARRAY: 100 OHM 1/16W	
RA 2	VR7-3260-101	N	1	RESISTOR,CHIP,ARRAY: 100 OHM 1/16W	
RA 3	VR7-3260-101	N	1	RESISTOR,CHIP,ARRAY: 100 OHM 1/16W	
RA 4	VR7-3260-562	N	1	RESISTOR,CHIP,ARRAY: 5.6K OHM 1/16W	
RA 5	VR7-3260-562	N	1	RESISTOR,CHIP,ARRAY: 5.6K OHM 1/16W	
RA 6	VR7-3260-562	N	1	RESISTOR,CHIP,ARRAY: 5.6K OHM 1/16W	
RA 7	VR7-3260-562	N	1	RESISTOR,CHIP,ARRAY: 5.6K OHM 1/16W	
SW 1	WC2-5346-000	N	1	SWITCH, PUSH: EVQQWN03W	
SW 2	WC3-5131-000	N	1	SWITCH, SLIDE: SSSS212-12	
SW 3	WC2-5346-000	N	1	SWITCH, PUSH: EVQQWN03W	
SW 4	WC2-5346-000	N	1	SWITCH, PUSH: EVQQWN03W	
TH 1	WP2-5075-000	N	1	CHIP, THERMISTOR: TH20-3M503F	
X 1	QH8-0005-000	N	1	OSCILLATOR, CRYSTAL: 23.040MHZ	
X 2	QH8-0006-000	N	1	OSCILLATOR, CRYSTAL: 24.000MHZ	
X 3	WK2-5875-000	N	1	OSCILLATOR, CRYSTAL: 32.768KHZ	

FIGURE 7 AC ADAPTER

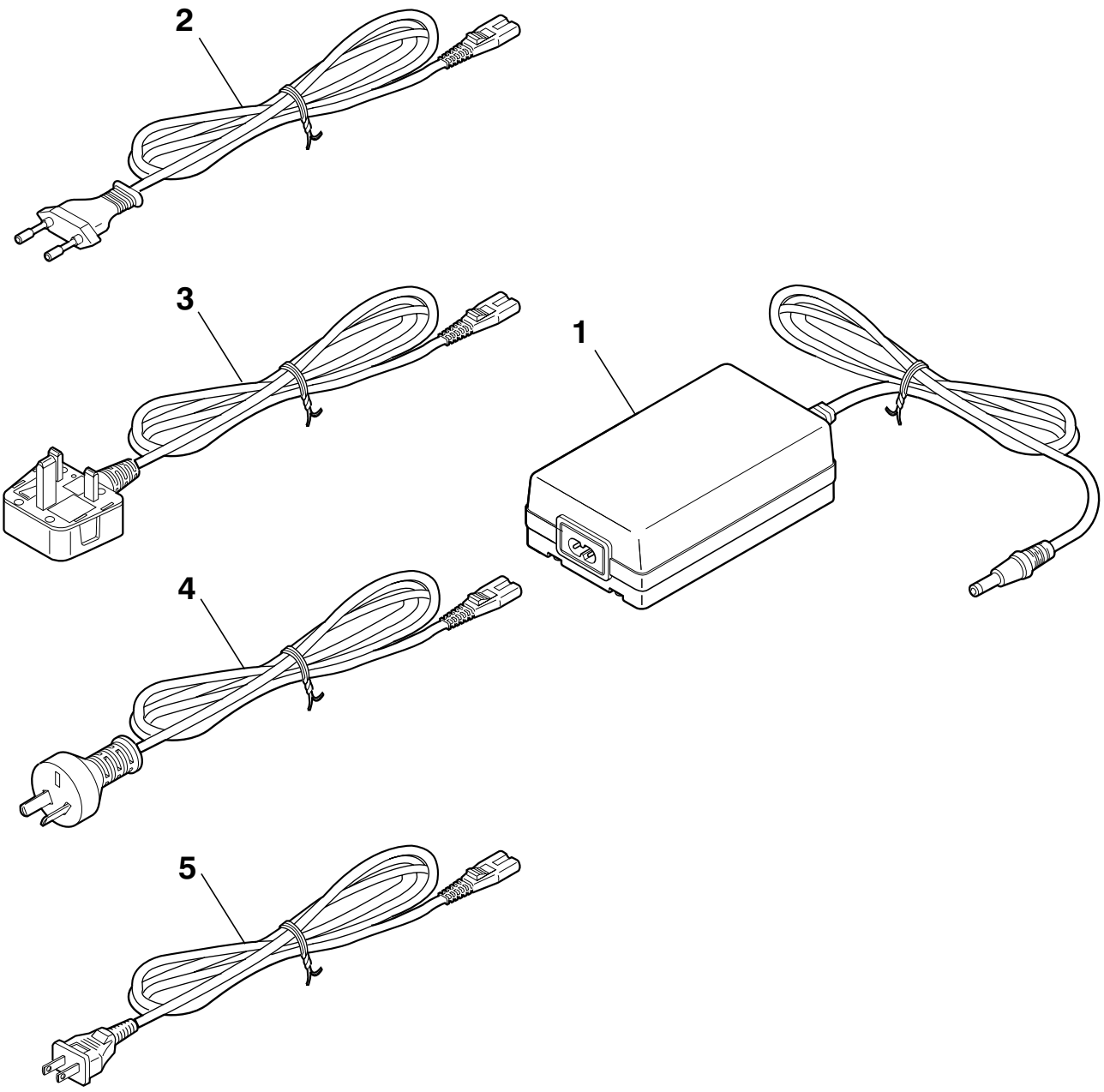


FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
7- 1	QH3-3349-000	N	1	AC ADAPTOR: 100V~240V 50/60HZ	OUTPUT 13VDC, 1.8A
2	WT3-5079-000		1	CORD, POWER	220V-240V
3	WT3-5080-000		1	CORD, POWER	220V-240V,UK
4	WT3-5081-000		1	CORD, POWER	220V-240V, AUST
5	WT3-5082-000		1	CORD, POWER	100V
	WT3-5085-000		1	CORD, POWER	250V,CHN
	WT3-5086-000		1	CORD, POWER	120V, NO POLARITY

C. SCREWS & WASHERS LIST

SCREW

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
S - 1	XA9-0989-000			LONG SCREW, M2.6X20	
2	XA4-4260-709			SHORT, SCREW, M2.6X7	
3	XA9-0742-000			SMALL SCREW, 5.5X2.6MM	
4	XA9-0983-000			SCREW, M1.6X4.6	

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D. TOOL

FIGURE 8 TOOL

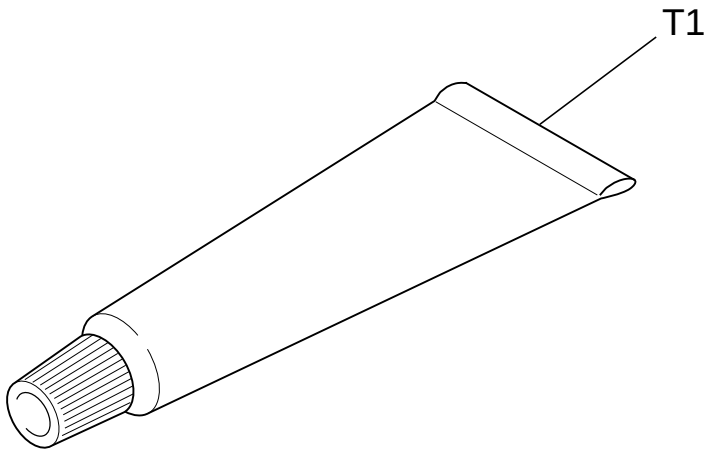

FIGURE & KEY NO.	PART NUMBER	RANK	QTY	DESCRIPTION	REMARKS
T- 1	CK-0562-000		1	GREASE, MOLYKOTE PG-641	

E. NUMERICAL INDEX

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
CK-0562-000	T - 1	GREASE, MOLYKOTE PG-641
QB1-1135-000	4 - 4	FOOT, RUBBER (B)
QB1-3190-000	2 - 11	STOPPER, BIG
QB1-3191-000	2 - 12	STOPPER, SMALL
QB1-3193-000	3 - 1	FILM, PROTECTION
QB1-3207-000	5 - 4	SPRING, COIL
QB1-3218-000	2 - 5	UPPER CASE
QB1-3219-000	2 - 5	UPPER CASE
QB1-3220-000	2 - 9	SWITCH 1
QB1-3221-000	2 - 8	SWITCH 2
QB1-3223-000	2 - 7	FILTER, IRDA
QB1-3224-000	2 - 6	COVER, CONNECTOR
QB1-3225-000	2 - 2	COVER, HEAD
QB1-3226-000	2 - 3	FILM, INSTRUCTION
QB1-3227-000	2 - 3	FILM, INSTRUCTION
QB1-3232-000	2 - 2	COVER, HEAD
QB1-3234-000	2 - 10	COVER, ASF
QF5-0373-000	4 - 2	LOWER CASE UNIT
QG2-2981-000	3 - 3	IRDA UNIT
QG2-2982-000	3 - 2	CONTROL PCB ASS'Y
QG2-2983-000	3 - 2	CONTROL PCB AASS'Y
QG5-1117-000	4 - 1	PRINT UNIT
QG5-1122-000	5 - 2	PRINTER BASE UNIT
QG5-1124-000	2 - 4	UPPER CASE UNIT
QG5-1125-000	2 - 1	HEAD COVER UNIT
QG5-1126-000	4 - 3	TRAY UNIT
QG5-1128-000	2 - 4	UPPER CASE UNIT
QG5-1129-000	2 - 1	HEAD COVER UNIT
QG5-1130-000	5 - 3	PINCH ROLLER UNIT
QG5-1132-000	4 - 1	PRINT UNIT
QH3-3349-000	1 - 3	AC ADAPTOR: 100V~240V 50/60HZ
	7 - 1	
QH7-8905-000	6 - IC 6	IC, T6W73, ASIC
QH7-8947-000	3 - 4	CONNECTOR, ASF
QH7-8964-000	6 - IC 10	IC, TC5316200CFT-EC07, MASKED-ROM
QH7-8968-000	6 - IC 10	IC,KM23C8100DT12KFX3G7T,MASKED-ROM
QH8-0004-000	6 - IC 9	IC, MBM29F400TC-70PFTN, FLASH-ROM
QH8-0005-000	6 - X 1	OSCILLATOR, CRYSTAL: 23.040MHZ
QH8-0006-000	6 - X 2	OSCILLATOR, CRYSTAL: 24.000MHZ
QH8-0007-000	6 - C 12	CAPACITOR, AL-EL: 1000UF 6.3V
QH8-0080-000	1 - 7	I/F CABLE
QH8-0088-000	6 - IC 9	IC, TC58F401FT-90, FLASH-ROM
VC7-5700-477	6 - C 18	CAPACITOR,AL-EL: 470UF 35V
	6 - C 19	
VC7-6890-336	6 - C 75	CAPACITOR, AL-EL: 33UF 25V
VC7-9360-228	6 - C 2	CAPACITOR, AL-EL: 2200UF 25V
VC8-1420-103	6 - C 71	CAPACITOR,CHIP,CERAMIC: 0.01UF 50V
	6 - C 76	
	6 - C 81	
	6 - C 82	
VC8-7370-225	6 - C 9	CAPACITOR, CHIP, CERAMIC: 2.2UF 16V
VC8-7380-105	6 - C 38	CAPACITOR, CHIP, CERAMIC: 1.0UF 50V
VC8-7390-105	6 - C 78	CAPACITOR, CHIP, CERAMIC: 1.0UF 10V
VC9-5530-000	6 - C 4	CAPACITOR, CHIP, CERAMIC: 2.2UF 16V
VC9-5531-000	6 - C 69	CAPACITOR, CHIP, CERAMIC: 4.7UF 10V
VD7-1565-000	6 - ICP 2	IC PROTECTOR, ICP-S0.5, 0.5A
VD7-1567-000	6 - ICP 1	IC PROTECTOR, ICP-S0.7, 0.7A
VD7-1764-001	6 - F 1	FUSE, 4.0A 48V, SLM40

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
VR7-1810-101	6 - R 8	RESISTOR,CHIP,METAL: 100 OHM 1/16W
	6 - R 64	
VR7-1810-102	6 - R 49	RESISTOR,CHIP,METAL: 1K OHM 1/16W
	6 - R 67	
VR7-1810-103	6 - R 18	RESISTOR,CHIP,METAL: 10K OHM 1/16W
	6 - R 38	
	6 - R 51	
	6 - R 94	
	6 - R101	
VR7-1810-113	6 - R 52	RESISTOR, CHIP: 11K OHM 1/16W
VR7-1810-123	6 - R 61	RESISTOR,CHIP,METAL: 12K OHM 1/16W
VR7-1810-153	6 - R 25	RESISTOR,CHIP,METAL: 15K OHM 1/16W
	6 - R102	
	6 - R103	
VR7-1810-162	6 - R 97	RESISTOR,CHIP,METAL: 1.6K OHM 1/16W
	6 - R 98	
VR7-1810-202	6 - R 2	RESISTOR,CHIP,METAL: 2K OHM 1/16W
	6 - R 16	
	6 - R 36	
VR7-1810-203	6 - R 54	RESISTOR, METAL: 20K OHM 1/16W
VR7-1810-223	6 - R 1	RESISTOR,CHIP,METAL: 22K OHM 1/16W
	6 - R 53	
VR7-1810-333	6 - R 60	RESISTOR,CHIP,METAL: 33K OHM 1/16W
VR7-1810-752	6 - R 12	RESISTOR,CHIP,METAL: 7.5K OHM 1/16W
	6 - R 13	
	6 - R 31	
	6 - R 66	
VR7-1810-821	6 - R 26	RESISTOR,CHIP,METAL: 820 OHM 1/16W
VR7-1830-474	6 - R 59	RESISTOR,CHIP,METAL: 470K OHM 1/10W
VR7-2040-120	6 - R 92	RESISTOR, CHIP: 12 OHM 1W
	6 - R 93	
VR7-2370-104	6 - R 62	RESISTOR,CHIP,METAL: 100K OHM 1/16W
	6 - R 63	
VR7-2370-184	6 - R 65	RESISTOR,CHIP,METAL: 180K OHM 1/16W
VR7-2370-304	6 - R 14	RESISTOR,CHIP,METAL: 300K OHM 1/16W
	6 - R 15	
VR7-2370-473	6 - R 86	RESISTOR,CHIP,METAL: 47K OHM 1/16W
VR7-2370-683	6 - R 24	RESISTOR,CHIP,METAL: 68K OHM 1/16W
VR7-3260-101	6 - RA 1	RESISTOR,CHIP,ARRAY: 100 OHM 1/16W
	6 - RA 2	
	6 - RA 3	
VR7-3260-562	6 - RA 4	RESISTOR,CHIP,ARRAY: 5.6K OHM 1/16W
	6 - RA 5	
	6 - RA 6	
	6 - RA 7	
VR7-3782-322	6 - R 17	RESISTOR,CHIP,METAL: 23.2K OHM 1/16W
	6 - R 37	
VR7-7420-138	6 - R 10	RESISTOR,CHIP,CARBON: 0.13 OHM 1/4W
	6 - R 11	
VR9-5498-000	6 - R 95	RESISTOR,CHIP,METAL: 0.39 OHM 1/2W
	6 - R 96	
	6 - R 99	
	6 - R100	
VR9-5499-000	6 - R107	RESISTOR,CHIP,METAL: 0.68 OHM 1/2W
VS1-5117-029	6 - CNH 1	CONNECTOR, 29P
VS1-5938-002	6 - CNBT 2	CONNECTOR, 2P
VS1-6354-004	6 - CNCR 1	CONNECTOR, 4P
VS1-6355-003	6 - CNSEN 2	CONNECTOR, 3P

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
VS1-6355-005	6 - CNLF 1	CONNECTOR, 5P
VS1-6355-008	6 - CNOP 1	CONNECTOR, 8P
VS1-6356-007	6 - CNSEN 1	CONNECTOR, 7P
VS1-6371-010	6 - CNIR 1	CONNECTOR, 10P
VS3-0171-002	6 - CNBT 1	CONNECTOR, BATTERY, 2P
VV1-0145-392	6 - R 48	RESISTOR,CHIP: 3.9K OHM 1/4W
VV1-1185-391	6 - R 68	RESISTOR,CHIP,METAL: 390 OHM 1/8W
VV1-6148-221	6 - R 6	RESISTOR, METAL: 220 OHM 1/4W
VV1-7115-181	6 - R113	RESISTOR, CHIP: 180 OHM 1/10W
VV1-7115-510	6 - R 28	RESISTOR, CHIP: 51 OHM 1/10W
VV1-8000-000	6 - L 3	JUMPER
	6 - R117	
VV1-8163-184	6 - R 3	RESISTOR, CHIP: 180K OHM 1/16W
VV1-8163-333	6 - R 4	RESISTOR, CHIP: 33K OHM 1/16W
VV1-8165-101	6 - R 55	RESISTOR, CHIP: 100 OHM 1/16W
	6 - R 56	
	6 - R 72	
	6 - R 87	
VV1-8165-102	6 - R 20	RESISTOR, CHIP: 1K OHM 1/16W
	6 - R 22	
	6 - R 39	
	6 - R 70	
	6 - R 71	
	6 - R 73	
	6 - R 78	
	6 - R 85	
	6 - R 88	
	6 - R 89	
VV1-8165-103	6 - R 5	RESISTOR, CHIP: 10K OHM 1/16W
	6 - R 19	
	6 - R 29	
	6 - R 45	
	6 - R 46	
	6 - R 57	
	6 - R 58	
	6 - R 80	
	6 - R 81	
	6 - R 82	
	6 - R104	
	6 - R106	
	6 - R116	
VV1-8165-104	6 - R 32	RESISTOR, CHIP: 100K OHM 1/16W
	6 - R112	
VV1-8165-105	6 - R 7	RESISTOR, CHIP: 1M OHM 1/16W
	6 - R 41	
	6 - R 43	
VV1-8165-152	6 - R 74	RESISTOR, CHIP: 1.5K OHM 1/16W
	6 - R115	
VV1-8165-183	6 - R108	RESISTOR, CHIP: 68K OHM 1/16W
	6 - R109	
VV1-8165-201	6 - R 21	RESISTOR,CHIP: 200 OHM 1/16
VV1-8165-221	6 - R 42	RESISTOR,CHIP: 220 OHM 1/16W
	6 - R111	
VV1-8165-222	6 - R114	RESISTOR,CHIP: 2.2K OHM 1/16W
VV1-8165-223	6 - R 34	RESISTOR, CHIP: 22K OHM 1/16W
	6 - R110	
VV1-8165-271	6 - R 40	RESISTOR,CHIP,METAL: 270 OHM 1/16W
VV1-8165-272	6 - R 30	RESISTOR,CHIP: 2.7K OHM 1/16W

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
	6 - R 47	
VV1-8165-301	6 - R 75	RESISTOR, CHIP: 300 OHM 1/16W
	6 - R 76	
	6 - R 77	
VV1-8165-334	6 - R 23	RESISTOR,CHIP,METAL: 330K OHM 1/16W
	6 - R 27	
	6 - R 50	
VV1-8165-472	6 - R 9	RESISTOR, CHIP: 4.7K OHM 1/16W
VV1-8165-473	6 - R 33	RESISTOR, CHIP: 47K OHM 1/16W
	6 - R 35	
	6 - R 44	
	6 - R 79	
	6 - R119	
VV1-8165-562	6 - R 69	RESISTOR, CHIP: 5.6K OHM 1/16W
	6 - R105	
VV1-8165-680	6 - R 90	RESISTOR, CHIP: 68 OHM 1/16W
VW4-1027-104	6 - C 1	CAPACITOR, CERAMIC: 0.1UF 25V
	6 - C 3	
	6 - C 5	
	6 - C 6	
	6 - C 8	
	6 - C 10	
	6 - C 11	
	6 - C 13	
	6 - C 17	
	6 - C 67	
	6 - C 68	
	6 - C 72	
	6 - C 74	
VW4-1037-103	6 - C 20	CAPACITOR,ML,CERAMIC:0.01UF 50V
	6 - C 25	
	6 - C 26	
	6 - C 27	
	6 - C 33	
	6 - C 34	
	6 - C 35	
	6 - C 36	
	6 - C 37	
	6 - C 42	
	6 - C 43	
	6 - C 44	
	6 - C 46	
	6 - C 47	
	6 - C 48	
	6 - C 58	
	6 - C 59	
	6 - C 60	
	6 - C 61	
	6 - C 77	
	6 - C 79	
VW4-1232-609	6 - C 28	CAPACITOR,CERAMIC: 6PF 50V
	6 - C 29	
VW4-1232-809	6 - C 30	CAPACITOR,CERAMIC: 8PF 50V
	6 - C 31	
VW4-1234-101	6 - C 7	CAPACITOR,CHIP,CERAMIC: 100 PF 50V
VW4-1234-331	6 - C 14	CAPACITOR,CERAMIC: 330PF 50V
VW4-1835-102	6 - C 21	CAPACITOR,CERAMIC: 1000PF 50V
	6 - C 22	

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
	6 - C 23	
	6 - C 24	
	6 - C 49	
	6 - C 50	
	6 - C 51	
	6 - C 52	
	6 - C 53	
	6 - C 54	
	6 - C 55	
	6 - C 56	
	6 - C 57	
	6 - C 62	
	6 - C 63	
	6 - C 64	
	6 - C 65	
	6 - C 66	
	6 - C 80	
VW4-1835-332	6 - C 15	CAPACITOR, CERAMIC: 3300PF 50V
	6 - C 16	
VW4-2825-104	6 - C 70	CAPACITOR,CHIP,CERAMIC: 0.1UF 25V
	6 - C 73	
WA1-5403-000	6 - D 1	
	6 - D 3	
	6 - D 4	
	6 - D 7	
	6 - D 9	
	6 - D 10	
	6 - D 11	
	6 - D 12	
	6 - D 13	
	6 - D 14	
	6 - D 15	
WA1-5803-000	6 - D 2	DIODE: D1FS4A
	6 - D 6	
WA1-5993-000	6 - DA 1	DIODE ARRAY: HZM6.8FA
	6 - DA 2	
	6 - DA 3	
	6 - DA 4	
	6 - DA 5	
	6 - DA 6	
	6 - DA 7	
	6 - DA 8	
WA1-6124-000	6 - D 5	DIODE: RB051L-40
	6 - D 8	
WA1-6175-000	6 - DZ 2	DIODE: HZU6.2B2
WA1-6176-000	6 - DZ 8	DIODE: HZU6.8B
WA1-6177-000	6 - DZ 5	DIODE: HZU15B2
	6 - DZ 9	
WA1-6179-000	6 - DZ 4	DIODE: HZU16B1
	6 - DZ 6	
WA1-6181-000	6 - DZ 3	DIODE: HZU27B
WA1-6182-000	6 - DZ 10	DIODE: HZU30B
WA1-6183-000	6 - DZ 12	DIODE: RLZ15B
WA1-6184-000	6 - DZ 1	DIODE: RLZ20B
WA2-0707-000	6 - Q 11	TRANSISTOR: 2SA1298Y
WA2-5142-000	6 - Q 13	TRANSISTOR: 2SC4617
	6 - Q 15	
	6 - Q 19	

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
	6 - Q 24	
WA2-5306-000	6 - Q 7	TRANSISTOR: DTA143EE
	6 - Q 14	
	6 - Q 16	
	6 - Q 22	
WA2-5449-000	6 - Q 2	TRANSISTOR: DTC143EE
	6 - Q 3	
	6 - Q 9	
	6 - Q 18	
	6 - Q 21	
	6 - Q 23	
WA2-6168-000	6 - Q 5	TRANSISTOR: 2SK2103 (FET)
WA2-6240-000	6 - Q 12	TRANSISTOR: 2SK2018-01S (FET)
WA2-6241-000	6 - Q 10	TRANSISTOR: 2SJ417TL (FET)
WA2-6489-000	6 - IC 15	TRANSISTOR ARRAY; UPA2003GR
	6 - IC 16	
WA2-6491-000	6 - Q 17	TRANSISTOR: 2SJ355 (FET)
WA2-6492-000	6 - Q 6	TRANSISTOR: DTA113ZE (PNP)
	6 - Q 8	
WA2-6494-000	6 - Q 20	TRANSISTOR: 2SA1900R (PNP)
WA2-6514-000	6 - Q 1	TRANSISTOR: SI4435DY (FET)
WA3-7960-000	6 - IC 14	IC, NM93C56TEM8, EEP-ROM
WA3-8685-000	6 - IC 13	IC, S-3510ANFJ, TIMER
WA4-5978-000	6 - IC 3	IC, NJM2904V, OP AMP
	6 - IC 7	
WA4-6372-000	6 - IC 5	IC, NJM2360AM, REGULATOR
WA4-6373-000	6 - IC 4	IC, SAI01, REGULATOR
WA4-6615-000	6 - IC 1	IC, NJM2103M, RESET
WA4-6654-000	6 - IC 12	IC, M54676P, DRIVER
WA4-7043-000	6 - IC 2	IC, MM1332C, DRIVER
WA4-7044-000	6 - IC 11	IC, BU4551BFV, D/D CONVERTER
WA7-0287-000	6 - IC 8	IC, GM71C4260CJ-60, DRAM
WC2-5346-000	6 - SW 1	SWITCH, PUSH: EVQQWN03W
	6 - SW 3	
	6 - SW 4	
WC3-5131-000	6 - SW 2	SWITCH, SLIDE: SSSS212-12
WE2-5207-000	6 - L 2	COIL: SBCP-13101HC
WE2-5243-000	6 - L 1	INDUCTOR: N08DPA221K
WE8-5423-000	6 - FB 1	FERRITE, BEADS: FBM4532HM132
	6 - FB 2	
WE8-5429-000	6 - FB 3	CHIP, FERRITE: BK1608LM182
	6 - FB 4	
	6 - FB 5	
	6 - L 4	
	6 - L 5	
	6 - L 6	
WE8-5493-000	6 - 7	FERRITE, BEADS: BK2125HS750
WG1-5565-000	6 - LD 1	LED: SEC1403C GREEN
WG2-5157-000	6 - LD 2	LED: SEC2494C
WK2-5875-000	6 - X 3	OSCILLATOR, CRYSTAL: 32.768KHZ
WP2-5075-000	6 - TH 1	CHIP, THERMISTOR: TH20-3M503F
WR1-5059-000	6 - BZ 1	BEEPER: CD11PA-Z
WS1-5527-000	6 - CNDC 1	DC CONNECTOR, LGP6531-0800
WS1-5687-000	6 - CNIF 1	CONNECTOR, 26P
WT3-5079-000	7 - 2	CORD, POWER
WT3-5080-000	7 - 3	CORD, POWER
WT3-5081-000	7 - 4	CORD, POWER
WT3-5082-000	7 - 5	CORD, POWER

PART NUMBER	FIGURE & KEY NO.	DESCRIPTION
WT3-5085-000	7 - 5	CORD, POWER
WT3-5086-000	7 - 5	CORD, POWER
XA4-4260-709	S - 2	SHORT, SCREW, M2.6X7
XA9-0742-000	S - 3	SMALL SCREW, 5.5X2.6MM
XA9-0983-000	S - 4	SCREW, M1.6X4.6
XA9-0989-000	S - 1	LONG SCREW, M2.6X20

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CANON INC.

BJC-50

SERVICE MANUAL

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BJC-50

SERVICE MANUAL

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I. ABOUT THIS MANUAL

This manual is divided into five parts containing the information required for servicing the BJC-50 printer.

Part 1: Safety and Precautions

This part contains information on how to service the unit safely. It is very important, and must be read.

Part 2: Product Specifications

This part outlines the product and its specifications.

Part 3: Operating Instructions

This part explains how to operate the unit properly, how it is installed, and how to use the service mode.

Part 4: Technical Reference

This part outlines the unit operation giving a technically.

Part 5: Maintenance

This part explains maintenance of the unit. It includes details of disassembly/assembly, adjustments required when assembling, troubleshooting procedures, and wiring/circuit diagrams, etc.

This manual does not contain complete information required for disassembling and assembling the BJC-50 printer. Please also refer to the separate Parts Catalog.

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Part 1

SAFETY AND PRECAUTIONS

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1. PERSONAL SAFETY PRECAUTIONS

1.1 Moving Sections of the Printer

Be careful not to let your hair, clothes, accessories, etc., become caught in any of the moving sections of the printer. The moving sections of the printer are the carriage belt, carriage ribbon cable and carriage, which are driven by the carriage motor, and the paper feed gear and roller, pinch roller, eject roller and spurs which are driven by the paper feed motor.

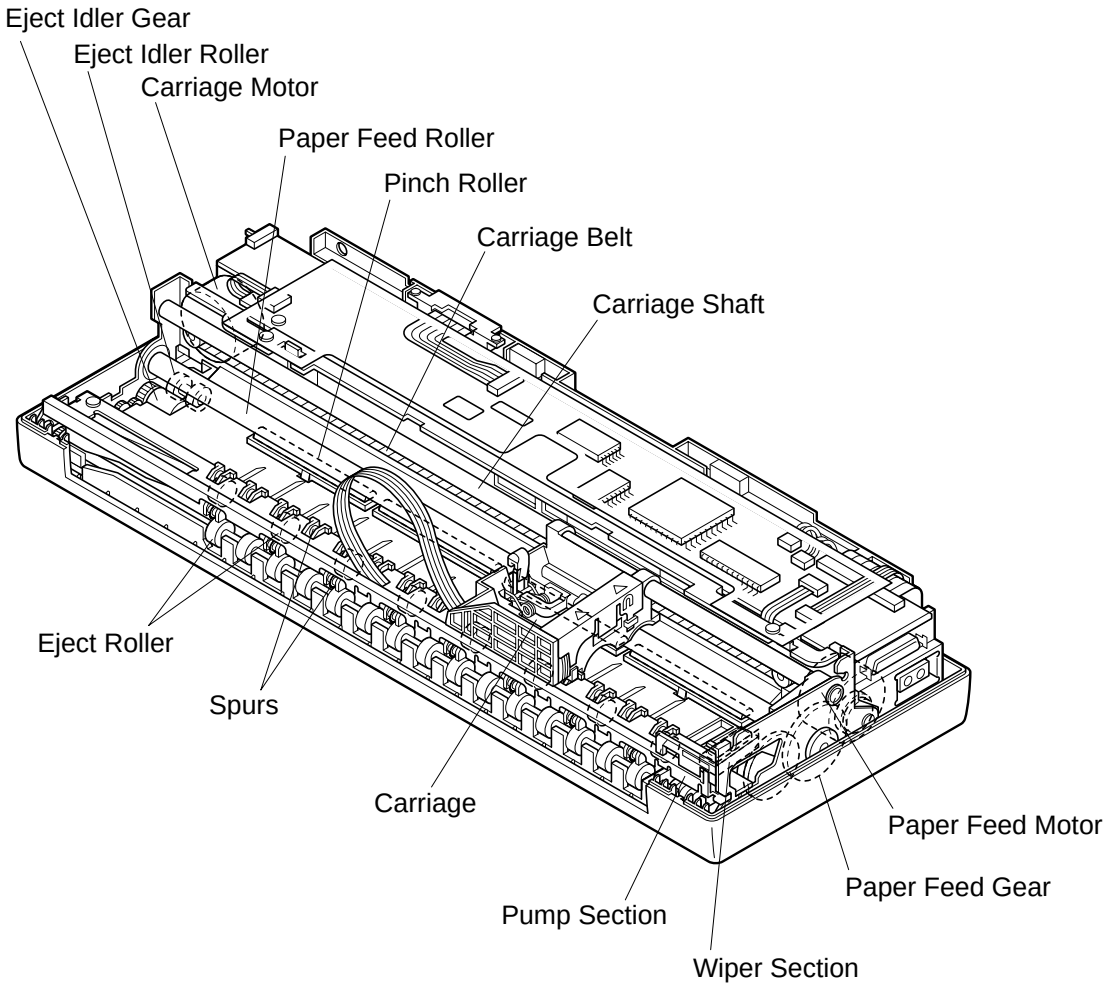


Figure 1-1 Moving Sections of the Printer

1.2 Ink Stains

1.2.1 Ink path

Be careful not to touch the ink path of the printer and get stains on the work table, hands, clothes, etc., during repair.
The ink path is the nozzle section of the BJ cartridge, the head cap, the head wiper, the maintenance jet receiving section and the waste ink absorber.
The ink inlets of the ink cartridge and the joint pipes of the print head body are also part of the ink path, so take the same precautions.

The ink is not a substance harmful to the human body, but it does contain an organic solvent (Black ink: isopropyl alcohol 67-63-0, glycerin 56-81-5, ethyleneglycol 107-21-1, Color ink: isopropyl alcohol 67-63-0). Be careful not to get any ink in your mouth or eyes. If you do get any into your eyes, wash it out with plenty of water and consult a doctor. If you somehow swallow a large amount of the ink, consult a doctor immediately. At that time, please communicate the items written on the BJ cartridge label. Since this ink contains dyes, if you get it on your clothes, etc., it will not come out.

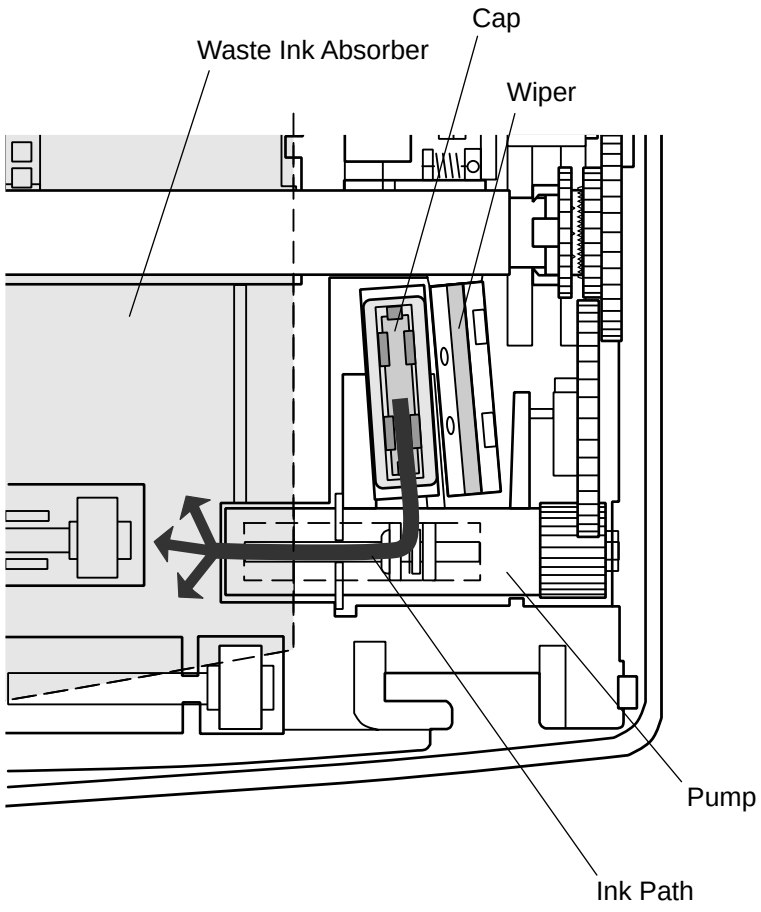


Figure 1-2 Ink Path

1.2.2 Ink mist

The BJ cartridge ejects the ink onto the paper. After the printer has been used for a long time or under heavy duty use, a small amount of ink mist bouncing off the paper during printing may soil the platen section and the purge section.
This soiling may soil the paper or the hands or clothes of service personnel, so wipe it off with a soft cloth or the like dampened with water.

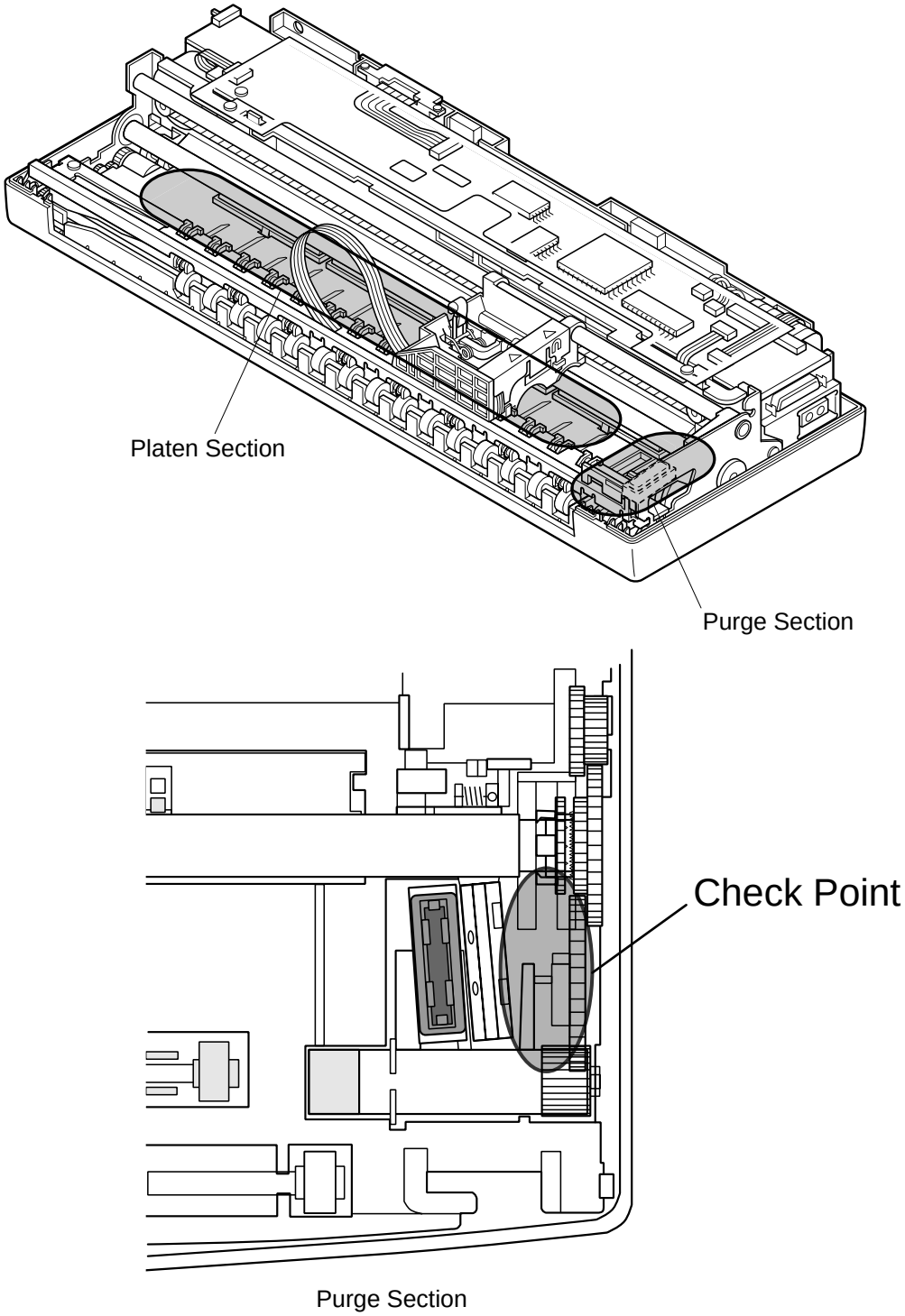


Figure 1-3 Ink Mist

1.3 BJ Cartridge Aluminum Plate

Do not touch the aluminum plate of the BJ cartridge. The aluminum plate heats up during printing and becomes particularly hot during continuous high duty printing. It also heats up if printing is operated after the ink in the cartridge has run out.

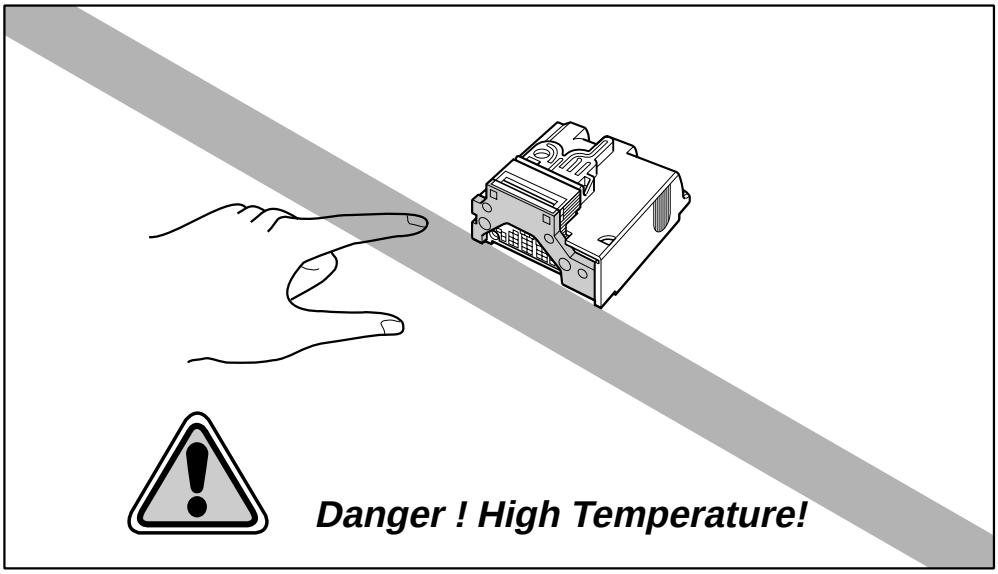


Figure 1-4 BJ Cartridge Aluminum Plate

NOTE

This printer has the following functions to protect against the above temperature rise. The temperature is detected by the head temperature sensor in the BJ cartridge. (ex. approx. 70°c at 100% Duty printing)

1) During printing, if a temperature rise is detected to above a certain temperature, in order to protect the printer, it will print unidirectionally with a wait after each line until the BJ cartridge cools down. Also *ERROR* indicator will blink and printing will slow down. If this temperature continues for more than a certain period of time, the beeper sounds 8 times, the *ERROR* indicator and *POWER* indicator blink to indicate a head temperature error.

Since the same type of temperature rise also occurs if printing is operated after the ink in the cartridge has run out, these protective functions are triggered. Therefore, the criterion for replacing the BJ cartridge or the ink cartridge is non-fire nozzles or diminished dot size during printing or the triggering of these protective functions.

REF.

When printing is stopped by a head temperature error, handle the printer as explained in *Part 5: 5. TROUBLESHOOTING (page 5-5).*

2. MACHINE PRECAUTIONS

2.1 BJ Cartridge

2.1.1 BJ cartridge handling

To prevent clogging at the nozzles due to foreign matters, never touch the nozzle section of the BJ cartridge or wipe it off with tissue paper or the like. For the BJ cartridge, take the same care with the ink filter of the print head body to prevent poor ink suction due to foreign matters. Also, once you have removed the head cap and peeled off the protection tape from a BJ cartridge, either install the BJ cartridge in the printer or store it in the cartridge container to prevent clogging at the nozzles due to ink drying or foreign objects. Do not reinstall the removed print head cap and protection tape on the BJ cartridge. For the BJ cartridge, either install it in the printer with the ink cartridge installed or store it in the cartridge container. If the ink cartridge is not attached, poor ink suction due to ink drying or foreign matters can occur. BJ cartridges cannot be disassembled, assembled, or washed.

NOTE

If clogging at the nozzles or poor ink suction occurs, horizontal white lines appear in part of the printing. If cleaning does not restore proper printing, you must replace the BJ cartridge.

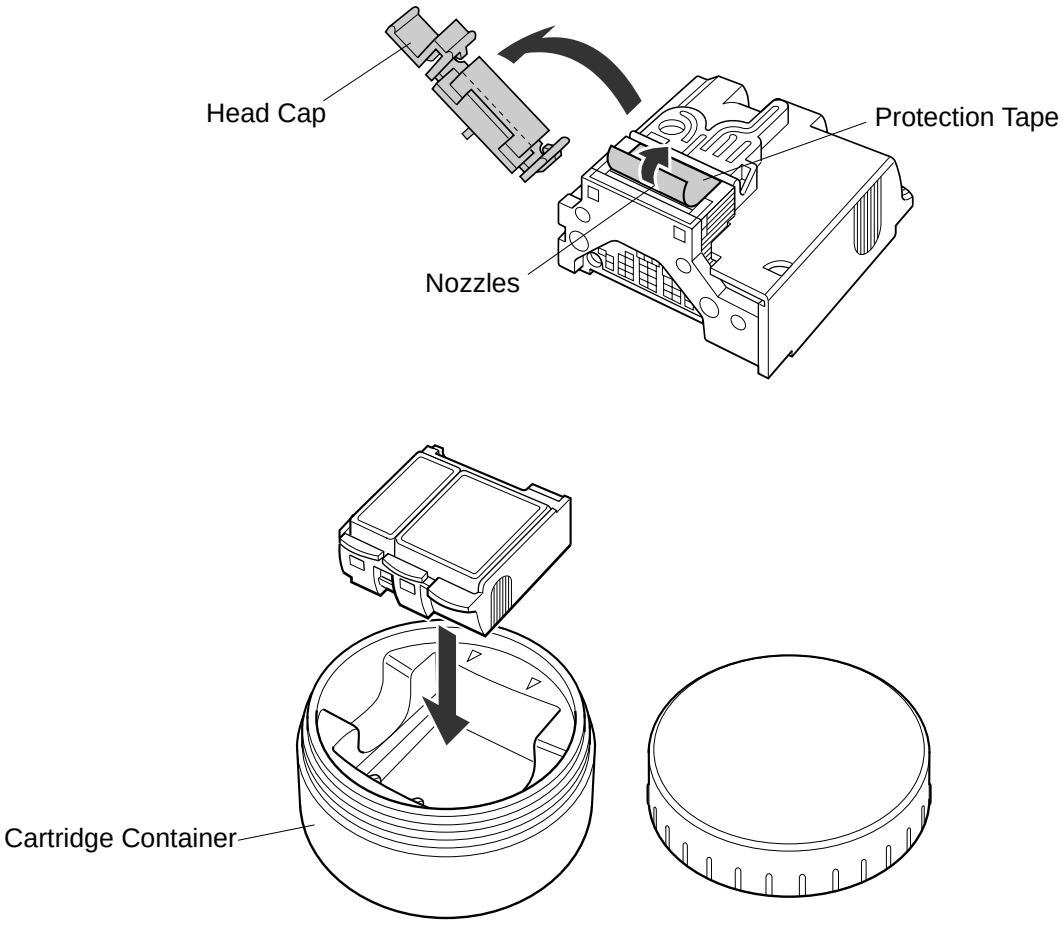


Figure 1-5 BJ Cartridge

2.1.2 Automatically capping

When the power is switched off with the *POWER* button, the printer automatically caps the nozzle section of the BJ cartridge to protect itself and prevent ink leakage. If you unplug the DC plug by mistake and cut off the power supply to the printer, plug the DC plug back in, start up the printer normally, then switch off the power with the *POWER* button.

If the nozzle section is not capped, it may clog at the nozzles due to ink drying, or the ink may leak from the nozzles.

2.1.3 When not using the printer

Even when not using the printer, leave the BJ cartridge installed in the printer or store it in the cartridge container.
Do the same when carrying, shipping or storing the printer.

If you remove the BJ cartridge from the printer and leave it as it is, foreign matters may stick or dry ink may clog the nozzle, making it impossible to use the BJ cartridge.

2.1.4 Ink conductivity

The ink in the BJ cartridge is electrically conductive. If it leaks onto a mechanical section, mop it up with a damp paper towel or the like. If it leaks onto an electrical section, mop it up completely with tissue paper or the like. Especially, if the ink enters as far as to the IC chip of the PCB and it is hard to wipe off completely, a new PCB should be used.

If the Universal adapter is connected to the printer with ink leaked, this may harm the electrical section. Never switch the power on if there has been a leak.

2.2 Ink Cartridge

2.2.1 Ink cartridge handling

To prevent poor ink suction due to foreign matters on the ink filter of the print head body, never touch the ink filter of the ink cartridge. When you remove the cap from an ink cartridge, install the ink cartridge on the print head body immediately to prevent clogging at the nozzles due to ink drying or foreign matters. Do not remove the ink cartridge unless you are replacing it.

Do not use the protection cap removed from the ink cartridge to store the ink cartridge. Install the ink cartridge in the print head immediately after unsealing the pillow bag.

NOTE

If clogging at the nozzles or poor ink suction occurs, horizontal white lines appear in part of the printing. If cleaning does not restore proper printing, you must replace the BJ cartridge.

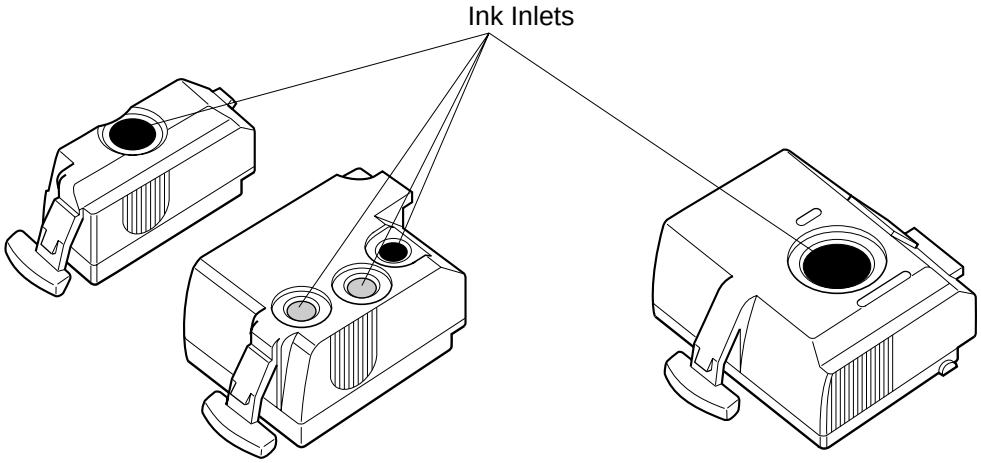


Figure 1-6 Ink Inlet of the Ink Cartridge

2.3 Lithium Ion Battery Handling

2.3.1 Initial precautions

The enclosed lithium ion battery must be installed in the printer and charged prior to its use. To ensure best performance, the lithium ion battery is only charged to 40% of its full capacity at the time of shipping. The battery must be fully charged once it is unpacked.

After connecting the AC adapter and turning on the printer, the installed battery automatically begins charging. However, the battery will not be charged while printing or cleaning. Charging temperature must be between 5 and 35 degrees Celsius otherwise the battery will not be charged.
The *CHARGE* indicator will light while the battery is charging and it will go off when charging is finished.

The lithium ion battery serves both as a battery when the Universal adapter is not connected and a manual paper feed guide. A NO BATTERY ERROR occurs (*ERROR* and *POWER* indicators light and beeper sounds 6 times) if a lithium ion battery is not installed.

2.3.2 Storage precaution

The advantages of a lithium ion batteries compared to Nicd and NiMH batteries are the low rate of self-discharge and the long lasting storage capacity. However, a drawback is that lithium ion batteries are susceptible to over discharge. At high temperatures, the rate of self-discharge is accelerated and the battery is rapidly over discharged.
When storing the unused lithium ion battery, avoid storage in direct sunlight or near heaters.
Also prevent storage at high temperature and make sure not to store the battery for an extended period of time.

2.4 Printer Handling

2.4.1 Precautions to prevent damage from static electricity

The electrical charge accumulated on a person when clothes rub can damage electric elements or change their electrical characteristics. Never touch the contact section of the carriage ribbon cable.

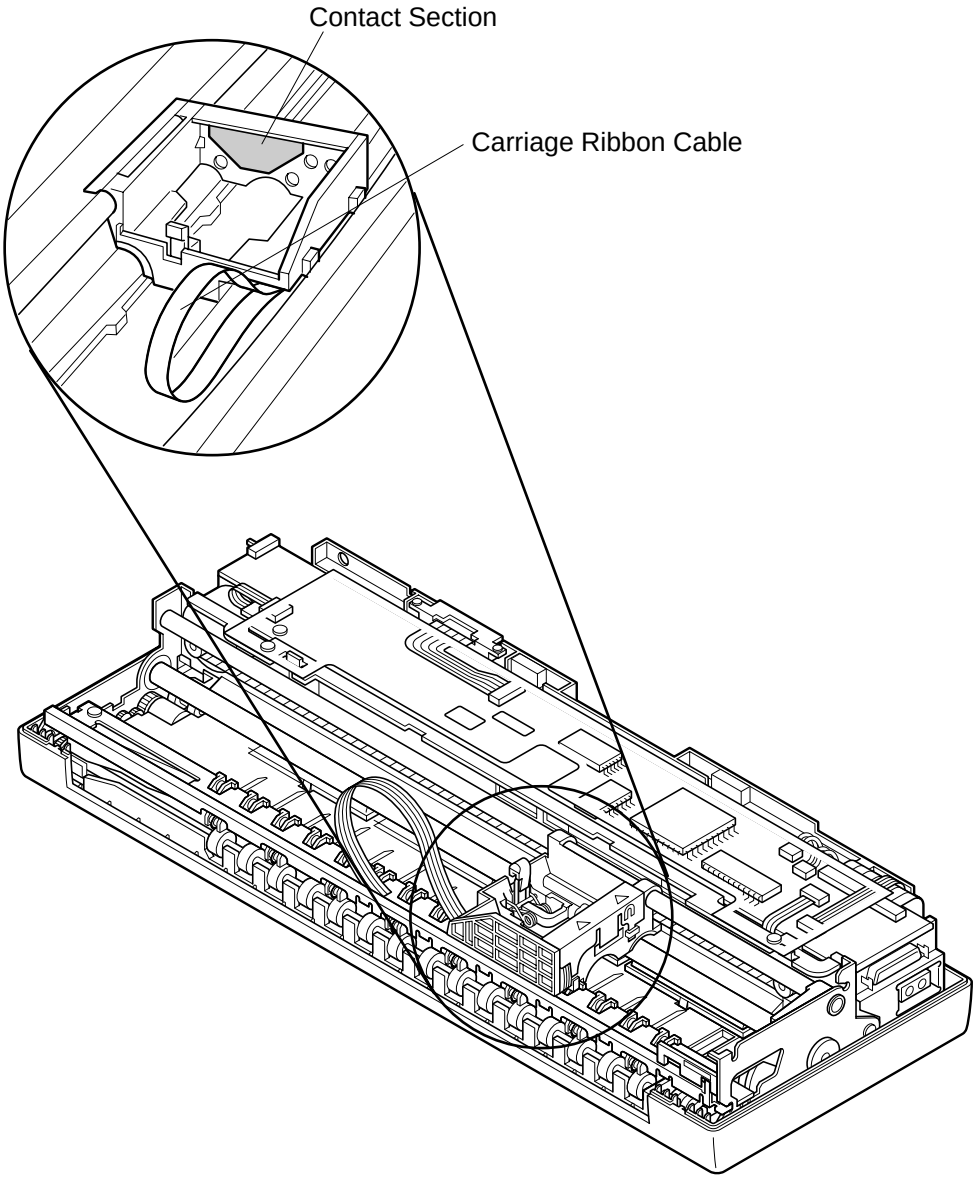


Figure 1-7 Contact Section of the Carriage Ribbon Cable

2.4.2 Ink leakage precautions

Do not carry, pack or store the printer without a BJ cartridge installed. The ink within the cap section will flow back and soil the inside of the printer.

The nozzle section of the BJ cartridge is capped automatically when the power is switched off with the *POWER* button.

When the power is turned off, the carriage is locked so that it does not move from the capping position.

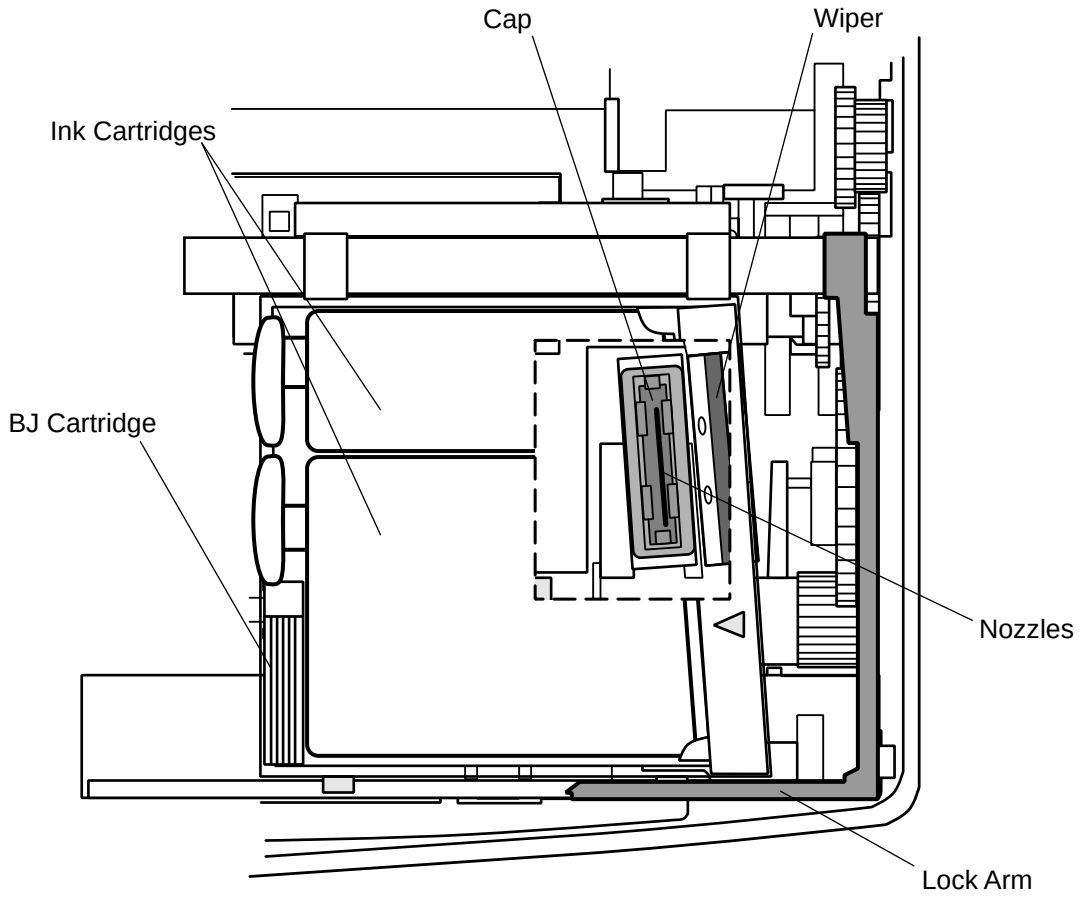


Figure 1-8 Capping Position

3. PRECAUTION FOR SERVICE

3.1 Precautions Concerning the Memory Data

This printer counts the total waste ink amount for the black BJ cartridge and the color BJ cartridge and stores these data in the EEPROM on the control board. Observe the following precautions during servicing.

1) Checking EEPROM data

The number of sheets printed is counted and stored in the EEPROM to show the printer operating status. This data can be printed by test print 3 (Ripple pattern print).

The waste ink quantity data is also stored in the EEPROM. This data is used to indicate a waste ink full error to prevent ink leakage if the amount of waste ink absorbed becomes full.

2) When replacing the control board

If the control board on which the EEPROM is mounted is replaced, the quantity of waste ink absorbed must be set in the EEPROM by visually checking the amount of waste ink absorbed into the absorber from behind the printer base unit.

If it is not set, the waste ink full error is not displayed, and ink may leak.

3) When replacing the printer base unit

If a waste ink full error is displayed and the printer base unit is replaced, the waste ink amount data in the EEPROM must be set to zero. If it is not set to zero, a waste ink full error is displayed and the printer stops operating before the waste ink absorber is filled with waste ink.

After the EEPROM is rest, the data it contained cannot be printed out with a test printout.

If you want to check the stored data, be sure to execute test printout before resetting the EEPROM.

When the stored data is reset, both the total count of printed sheets and the total waste ink amount will be reset together. These settings cannot be reset individually.

4) Rewriting the flash ROM

The flash ROM on the control board serves as the control section of the printer. In earlier models a socket type masked ROM had to be upgraded by physically inserting a new upgraded masked ROM. The flash ROM can be rewritten and hence upgrading has been facilitated.

When flash ROM needs to be upgraded, a FD containing the upgrading program will be distributed. Using this FD in a computer, the flash ROM of the printer can be upgraded. In order to rewrite the flash ROM, both the printer and computer need to be set in the rewrite modes.

For details on checking the memory data with test print and for clearing them, see *Part 3: 3.6 EEPROM Data Setting (page 3-23).*

When operation is stopped for the waste ink full error, handle the printer as explained in *Part 5: 5. TROUBLESHOOTING (page 5-5).*

When rewriting the flash ROM, refer to the settings in *Part 3: 3.7 Rewriting the Flash ROM (page 3-26).*

3.2 Precautions to Prevent Damage from Static Electricity

The electrical charge accumulated on a person when clothes rub can damage electric elements or change their electrical characteristics. In order to prevent static electricity, make sure to touch some metallic part that is grounded to release the static electricity accumulated on your body before disassembling the printer for service.

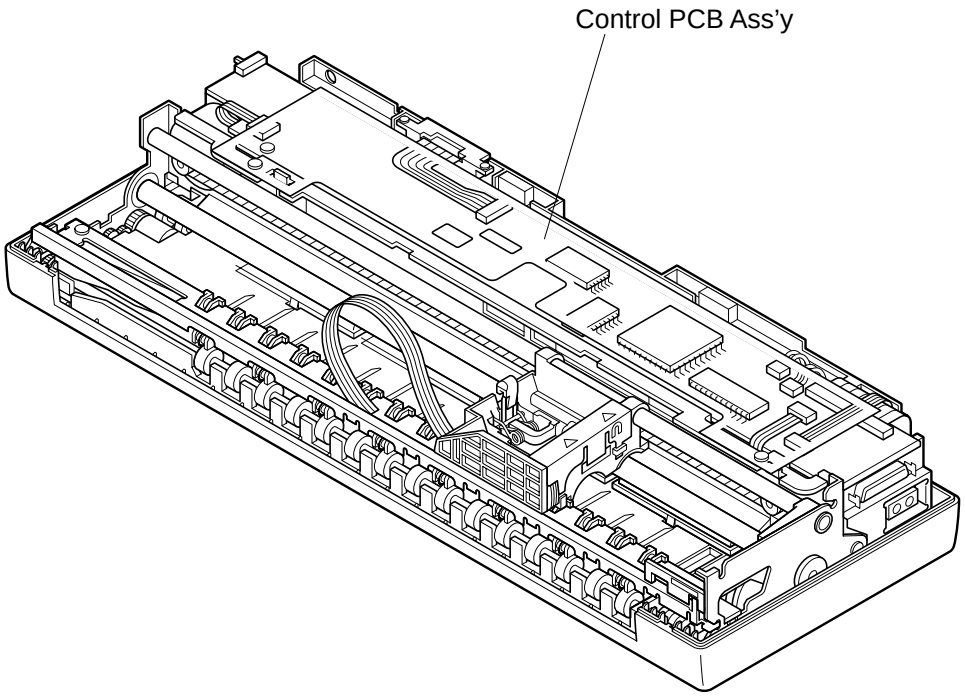


Figure 1-9 Electronic System of the Printer

3.3 Precautions for Disassembly/Assembly

The printer is made by combining many plastic parts. When disassembling the printer, be careful not to brake or bend plastic hooks.
Take special care not to rip or bend the flexible cables when removing and reinserting them on the control board as they are very thin and frail. Also to prevent misconnection, make sure the cable is fully inserted in the connector.
Details of disassembly and reassembly procedures are given in the Parts Catalog.

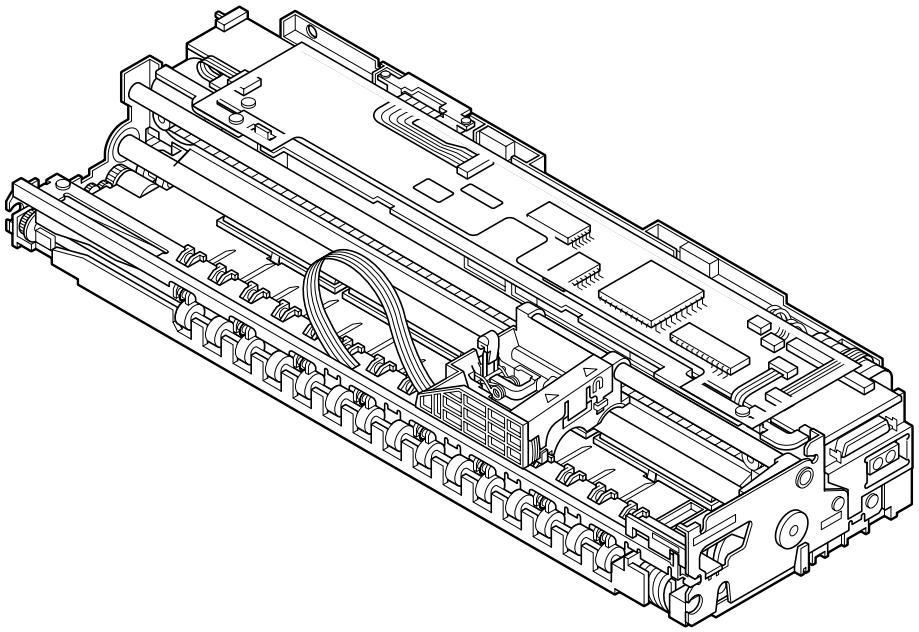


Figure 1-10 Control Board

Some of the plastic parts contain glass fibers for extra rigidity and precision. Due to their inflexible nature these plastic hooks break easily. Use a precision screwdriver or the like for disassembly, and do not apply excessive force to release a hook.

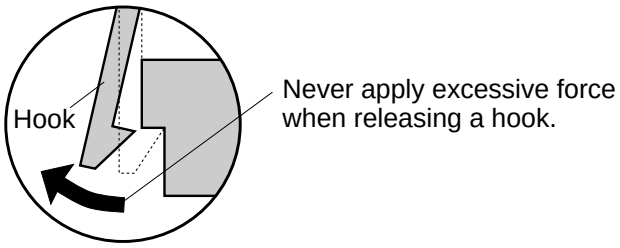


Figure 1-11 Removing Plastic Hooks

When replacing the IrDA unit, be careful not to touch the light emitting and receiving parts. (Touching these parts may offset the optical axis or soil the lens and possibly inhibit infrared communication.)

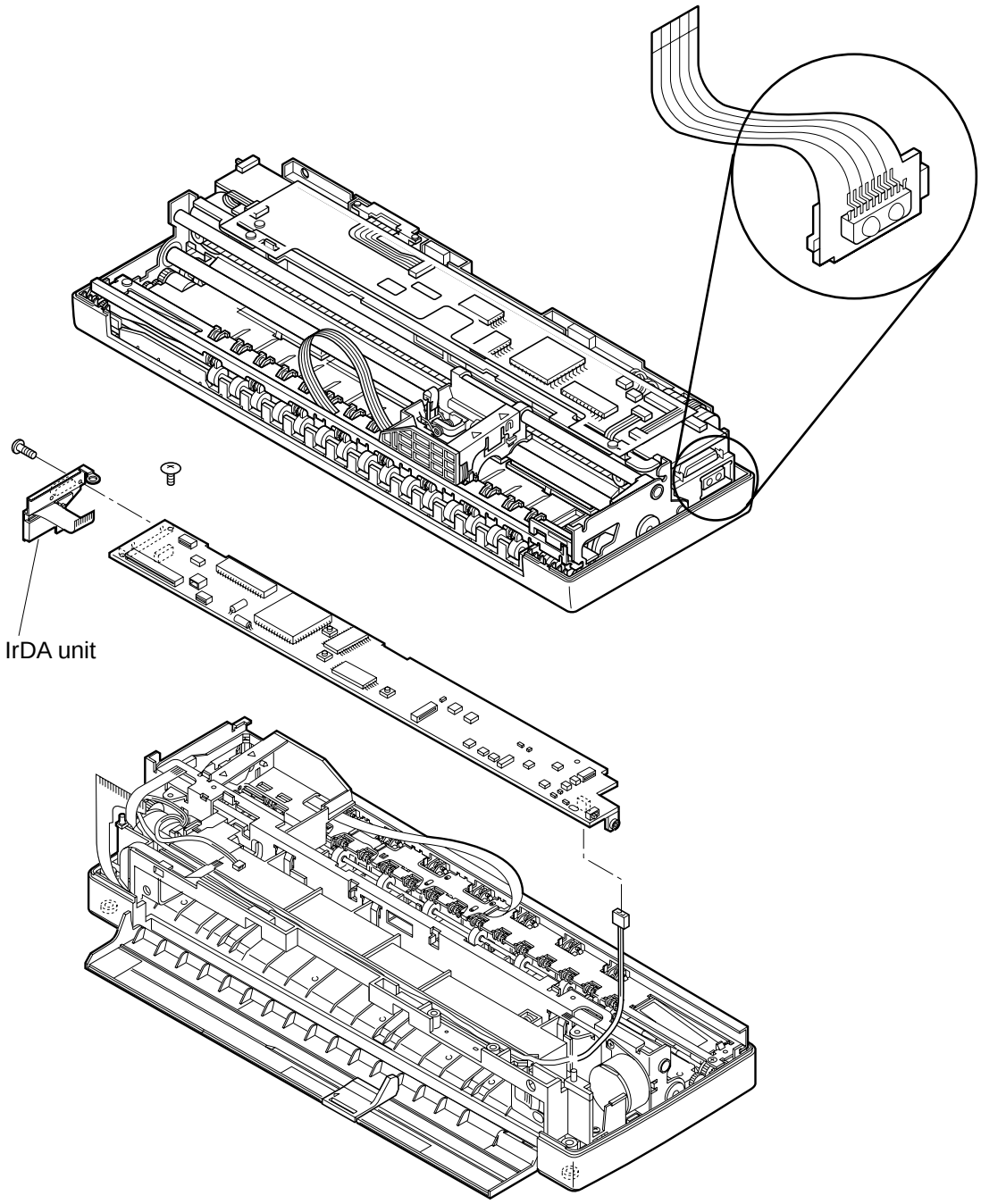


Figure 1-12 IrDA Unit

3.4 Built-in Self-diagnostic Functions

The printer has built-in self-diagnostic functions to judge hardware defects. The results of self-diagnosis are indicated by the indicators and the beeper. For details, see *Part 3: 3.1 Error Indications (page 3-12).*

Part 2

PRODUCT SPECIFICATIONS

Page	
2 - 1	1. PRODUCT OUTLINE
2 - 1	1.1 Product Outline
2 - 2	1.2 Features
2 - 3	1.3 BJ Cartridge
2 - 5	1.4 Options
2 - 8	1.5 Consumable
2 - 9	2. SPECIFICATIONS
2 - 9	2.1 General Specifications
2 -13	2.2 Paper Specifications
2 -15	2.3 Interface Specifications
2 -22	2.4 Character Code Table

1. PRODUCT OUTLINE

1.1 Product Outline

The BJC-50 bubble-jet full-color portable printer was carefully designed to improve mobility and it is more portable than ever. Lighter and more compact than previous models, the BJC-50 has new features such as the lithium ion battery and the exclusive IEEE 1284 compatible cable. The lithium ion battery allows manual feed printing at all times even when AC power is not available. The new IEEE 1284 compatible cable has a slim printer connector and it is less bulky than connector cables used in previous models. Another feature is the IrDA module which has realized wireless infrared communication. Color graphics printed on paper have also been improved by the introduction of drop modulated BC-11e cartridges that allow richer expression using large and small ink droplets. Using the optional scanner cartridge (IS-12), the BJC-50 can also be used as a portable color scanner.

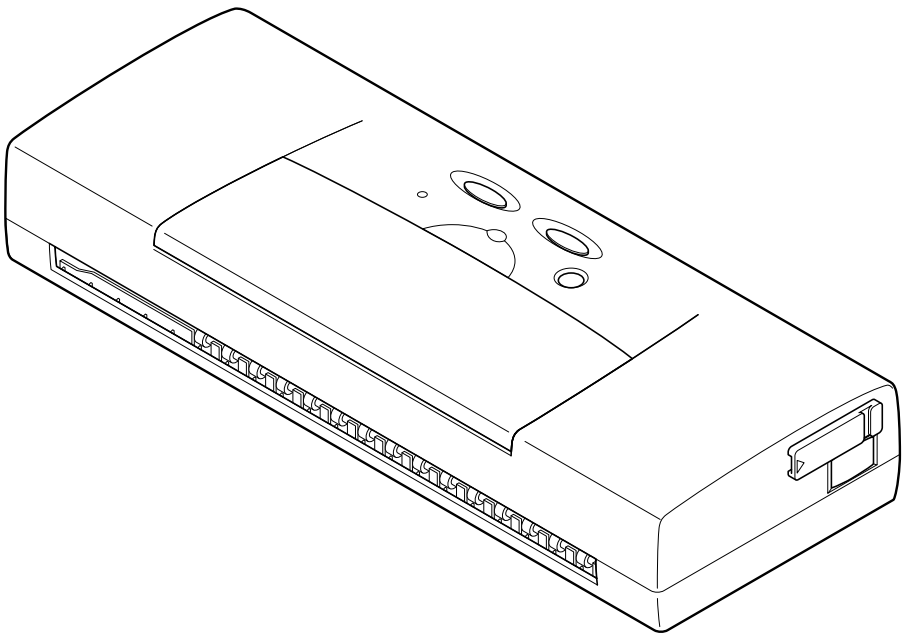


Figure 2-1 Printer Appearance

1.2 Features

1.2.1 Printer

- Compact portable size
  External dimensions: 300 mm (11.8") W ∞ 112.5 mm (4.4") D ∞ 49 mm (1.9") H
  Weight: Approx. 0.9 kg (2.0 lb) (lithium ion battery included)
- Built-in manual sheet feeder
- High-speed printing (bursts)

	HQ mode	HS mode
BC-11e (ANK 10cpi)	173cps	217cps
BC-10 (ANK 10cpi)	346cps	434cps

- High quality printing at 720 dpi
- Three built-in standard printer control modes:
  BJ mode (IBM Proprinter X24E emulation)
  LQ mode (EPSON LQ printer emulation)
  Native mode (Canon extended mode)
  BJL command
- Two new user-friendly replaceable black and color BJ cartridges:
  Black BJ cartridge BC-10: 128 nozzles (black), ink cartridge replaceable.
  Color BJ cartridge BC-11e: 136 nozzles (64 black + 3 ∞ 24 each yellow, magenta, cyan); black and color ink cartridges replaceable.
  Ink cartridge BCI-10 Black: Black ink cartridge for BC-10
  Ink cartridge BCI-11 Black: Black ink cartridge for BC-11e
  Ink cartridge BCI-11 Color: Color ink cartridge for BC-11e (yellow, magenta, and cyan all in one cartridge)
- Includes a BJ cartridge container for storing a BJ cartridge when it is not installed in the printer.
- Power on/off button (Software power switch used.)
  The printer does not have a mechanical power switch that physically connects and disconnects the Universal adaptor. Instead, it has a *POWER* button that starts up and shuts down printer operation. As long as the printer is plugged in, power is supplied even when it is turned off.
- Lock switch
  The switch can be used to lock the power on/off button to prevent accidentally turning on the printer while travelling. The lock is used after the power has been turned off.
- Bidirectional Centronics Interface (IEEE 1284 compatible)
  An exclusive IEEE 1284 compatible cable with a small connector on the printer connecting end is used.
- Infrared communication (IrDA (1.0) compatible)
- Printing up to legal size paper
- Optional scanner cartridge
  The printer can be used as a scanner when an image scanner cartridge (option) is installed instead of the BJ cartridge.

1.3 BJ Cartridge

1.3.1 Color BJ cartridge [BC-11e]

The BC-11e color BJ cartridge used for color printing is disposable. It comprises the print head with 136 nozzles and the replaceable ink cartridges (black and color).
The heater board inside the printhead is located one in front of the other to separately print large and small ink droplets.
If a print defect occurs, do a head cleaning. If print quality is not restored, try again once or twice. If the problem persists, perform a head refreshing. [Cleaning: 2 beep, with *RESUME* button; Head refreshing: 3 beeps, with *RESUME* button] If the head refreshing cannot restore the print quality, replace the BJ head.
If the ink runs out or if more than six months have passed after the BJ cartridge was unsealed and the print quality is not improved by cleaning the print head once or twice, the ink cartridge should be replaced with a new one. Also the three ink color integrated type cartridge must be replaced if one of the inks runs out.
The head has a total of 136 nozzles in a line: 24 yellow nozzles, 24 magenta nozzles, 24 cyan nozzles, and 64 black nozzles.
Numbers of sheets printed
Black: Approx. 23 sheets (HQ mode, 7.5% duty per color pattern)
Color: Approx. 30 sheets (HQ mode, 7.5% duty per color pattern)
BJ cartridge is printed with high quality at 360 dpi.

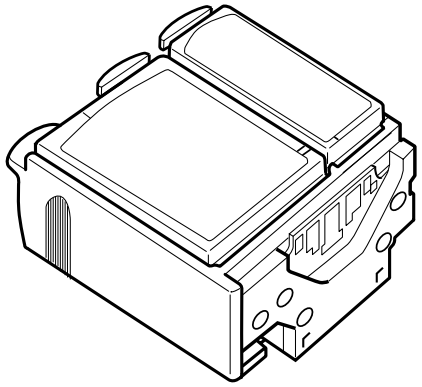


Figure 2-2 Color BJ Cartridge [BC-11e]

1.3.2 Black BJ cartridge [BC-10]

The BC-10 black BJ cartridge used for super-high speed monochrome printing is disposable. It combines the print head with 128 nozzles and the replaceable black ink cartridge.

If a print defect occurs, do a head cleaning. If print quality is not restored, try again once or twice. If the problem persists, perform a head refreshing. [Cleaning: 2 beep, with *RESUME* button; Head refreshing: 3 beeps, with *RESUME* button] If the head refreshing still cannot restore the print quality, replace the BJ head.

If the ink runs out or if more than six months have passed after the BJ cartridge was unsealed and the print quality is not improved by performing cleaning once or twice, the ink cartridge should be replaced with a new one.

The BC-10 BJ cartridge can print approx. 140 sheets in HQ mode (1500-character pattern). On plain paper and transparencies it has the same high resolution of 360 dpi as the BC-11e.

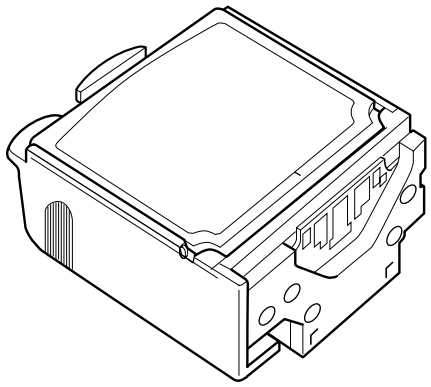


Figure 2-3 Black BJ Cartridge [BC-10]

To prevent nozzle clogging, after opening the seal, either install the BJ cartridge on the printer or store it in the BJ cartridge container. Also, never touch the print head (bubble jet nozzles) or wipe it with tissue paper or the like.

1.4 Options

1.4.1 BJ cartridge container

The BJ cartridge container is for storing BJ cartridges removed from the printer. When storing a BJ cartridge close the lid securely. One BJ cartridge container can store either the BC-10 or BC-11e.

Store the BJ cartridges with the ink cartridges attached. When storing a BC-11e, always store it with the two ink cartridges, BCI-11 black and BCI-11 color intact. (Store a BC-10 cartridge with the BCI-10 black ink cartridge intact.)

If the ink cartridge is not attached, ink may spill out of the nozzles and may be clogged with ink. When storing a BJ cartridge in the container, do not attach the protection tape and head cap to the cartridge as color mixing or foreign substances adhering to the printhead may affect the printhead performance.

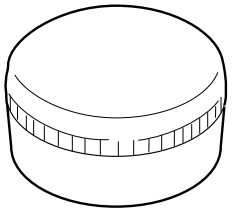


Figure 2-4 Cartridge Container

1.4.2 Lithium ion battery (LB-50)

When installed on the printer, the lithium ion battery provides enough power to operate the printer. The removable lithium ion battery can be recharged by connecting the Universal adapter to it. The electrical circuit for recharging is inside the printer.

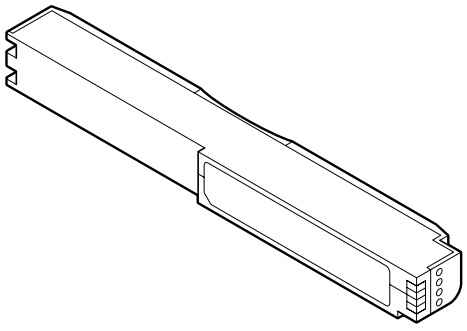


Figure 2-5 Lithium Ion Battery

1.4.3 Universal adapter (AD-360U)

There is an Universal adapter adapted for each country to supply DC voltage to the printer.

There is also a Universal adapter with AC plug cable, which supplies 100-250V AC input voltage to the printer.

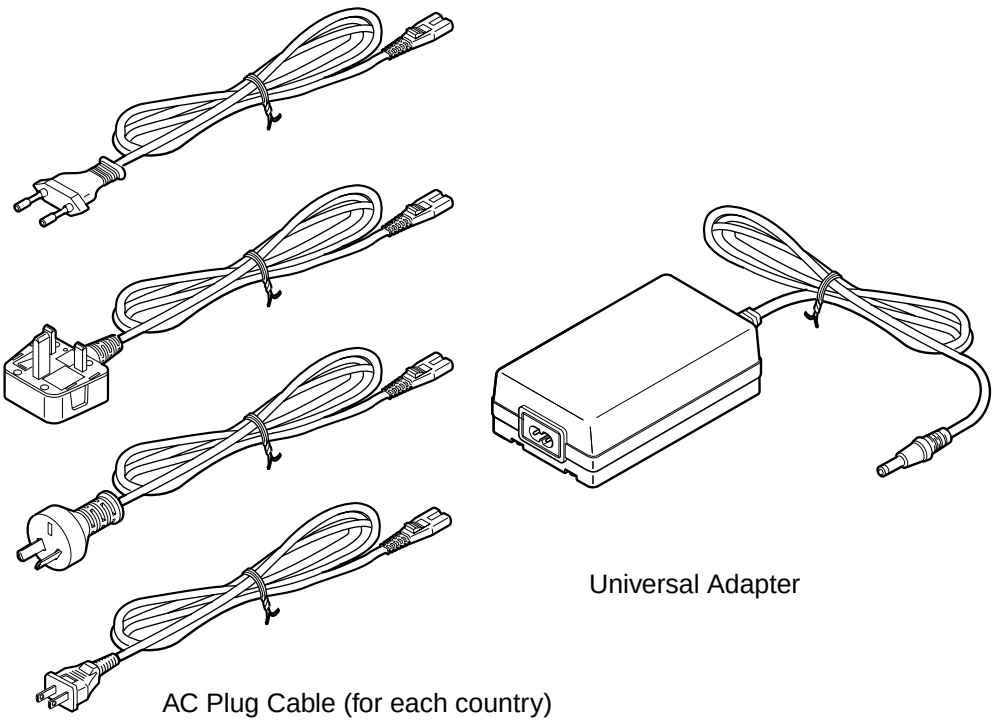


Figure 2-6 Universal Adapter

1.4.4 Color image scanner cartridge (IS-12)

The printer can be used as a color scanner when the color image scanner cartridge (IS-12) is installed in the printer carriage and the scanner driver is installed in the host computer. The appearance of the color image scanner cartridge IS-12 is identical to the BJ cartridge.

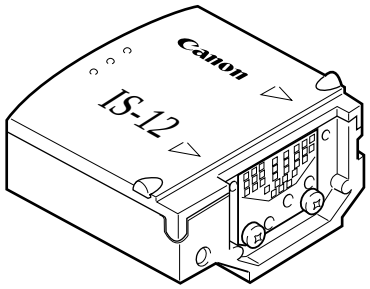


Figure 2-7 Color Image Scanner Cartridge

1.4.5 Interface Cable (BIFC-50)

The IEEE 1284 compatible bidirectional parallel interface cable uses a Canon exclusive small-size connector on the printer connecting end. The computer connecting end remains unchanged.

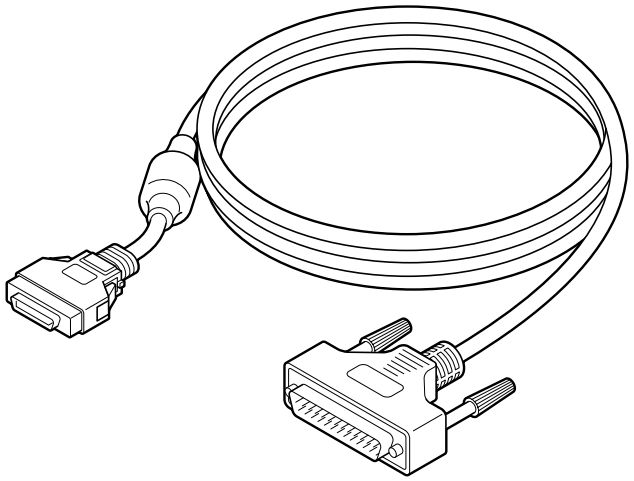


Figure 2-8 Interface Cable

1.5 Consumables

1.5.1 BJ cartridge (Color and Black)

Replacement BJ cartridges are the same as the ones supplied with the printer.

1.5.2 Ink cartridge

The consumable ink cartridges are the same as the ink cartridges installed in the BC-11e color BJ cartridge and BC-10 black BJ cartridge. There are three types: BC-11e black ink cartridge (BCI-11 black), color ink cartridge (BCI-11 color), and BC-10 black ink cartridge (BCI-10 black).

The ink cartridges must be used within 6 months after the seal is opened.

Numbers of sheets printed:

BCI-11 Color ink cartridge

Black: Approx. 23 sheets (HQ mode) (7.5% duty per color pattern)

Color: Approx. 30 sheets (HQ mode) (7.5% duty per color pattern)

BCI-10 Black ink cartridge

Black: Approx. 140 sheets (HQ mode) (1500-character pattern)

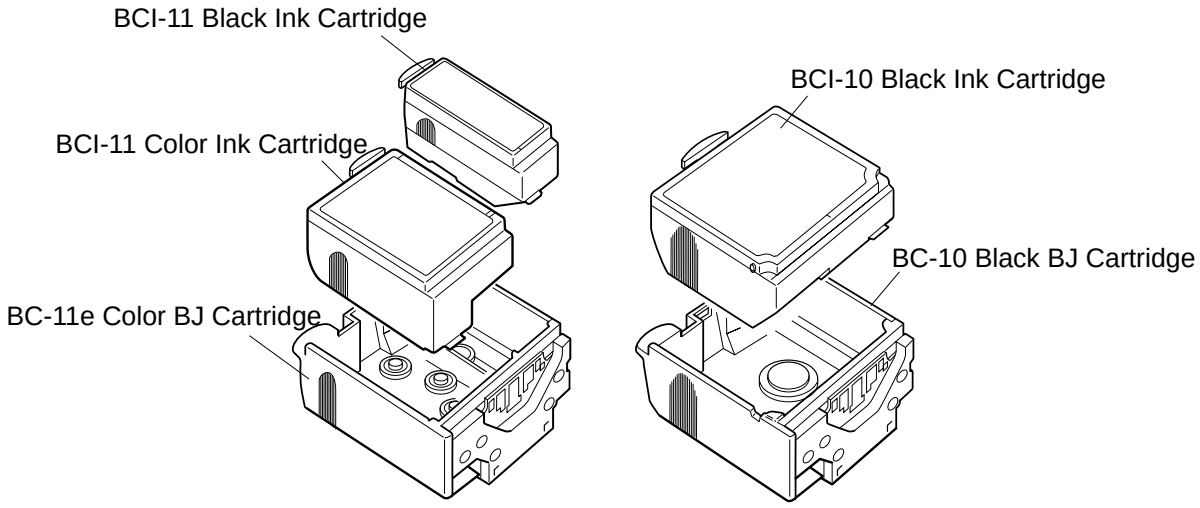

BCI-11 Black Ink Cartridge
BCI-10 Black Ink Cartridge
BCI-11 Color Ink Cartridge
BC-10 Black BJ Cartridge
BC-11e Color BJ Cartridge

Figure 2-9 Ink Cartridge

1.5.3 Lithium ion battery (LB-50)

Over discharge can be prevented by regularly recharging the battery. Lithium ion batteries do not have a memory effect and have a long lasting storage capacity. A good indication of the service life of a battery is when the number of printouts or duration of a charged battery starts to decrease. Replace the battery with a new one when this happens.

2. SPECIFICATIONS

2.1 General Specifications

1. Type Portable serial printer (Bubble jet ink on-demand)

2. Paper handling Manual sheet feed

3. Sheet feeder capacity

Plain paper:	Max. 1 sheet (between 64g/m^2 and 105g/m^2)
Coated paper:	Max. 1 sheet
Transparency film:	Max. 1 sheet
BPF:	Max. 1 sheet
Glossy paper:	Max. 1 sheet
Glossy film:	Max. 1 sheet
BJ cloth:	Max. 1 sheet
Envelope:	Max. 1 envelope

4. Printing speed

Burst

	BC-11e (Black printing)	BC-10 (Black printing)
HQ mode	173 cps (10 cpi)	346 cps (10 cpi)
HS mode	217 cps (10 cpi)	434 cps (10 cpi)

5. Printing direction (automatically selected according to the print data)

Bidirectional/Unidirectional

6. Print width

Max. 203.2mm (8")

7. Line feed speed

Approx. 136 ms/line (128"/360" line feed)

8. Built-in print control mode

BJ mode IBM Proprinter X24E emulation
LQ mode Epson LQ printer emulation
Native mode (Canon extended mode)
BJL command

9. Line feed pitch (n: programmable)

BJ mode	1/6", 1/8", n/60", n/72", n/180", n/216", and n/360" (n: programmable)
LQ mode	1/6", 1/8", n/180", n/216", and n/360"

10. Printing characters

Type face	Roman, Gothic, Courier, Prestige and Draft	
Pitch	BJ mode	10, 12, 17 cpi, and PS
	LQ mode	10, 12, 15, 17, 20 cpi, and PS
Character matrix	HQ mode	36 (H) × 48 (V) dots
	HS mode	18 out of 36 (H) × 48 (V) dots

11. Character set

BJ mode:	IBM character set 1, 2 and all (code page 437, 850, 860, 863, 865, 857, 855, 852, 864 and 869)
LQ mode:	Italic character set and Graphic character set

12. Number of columns printed

	Mode	Pitch	cpl
BJ mode	10 cpi	10 cpi	80 cpl
	10 cpi doublewide	5 cpi	40 cpl
	10 cpi condensed	17 cpi	137 cpl
	10 cpi condensed-doublewide	8.5 cpi	68 cpl
	12 cpi	12 cpi	96 cpl
	12 cpi doublewide	6 cpi	48 cpl
	Proportional spacing	PS	Varies
LQ mode	10 cpi	10 cpi	80 cpl
	10 cpi doublewide	5 cpi	40 cpl
	10 cpi condensed	17 cpi	137 cpl
	10 cpi condensed-doublewide	8.5 cpi	68 cpl
	12 cpi	12 cpi	96 cpl
	12 cpi doublewide	6 cpi	48 cpl
	12 cpi condensed	20 cpi	160 cpl
	12 cpi condensed-doublewide	10 cpi	80 cpl
	15 cpi	15 cpi	120 cpl
	15 cpi doublewide	7.5 cpi	60 cpl
	Proportional spacing	PS	Varies

13. Bit image

Vertical	8, 24 and 48 dots
Horizontal	60, 120, 180, 240, 360 and 720 dpi

	Input buffer	Download buffer
BJ mode	34 kB (or 2kB)	0 kB (or 32kB)
LQ mode	25 kB (or 2kB)	0 kB (or 23kB)

14. Buffer

15. Interface

Bidirectional parallel interface (IEEE 1284 compatible)
IrDA (1.0 compatible)

16. BJ cartridge

1) BC-11e

Type	Ink cartridge replaceable type of color BJ cartridge (large and small ink droplet producing type.)	
Print head	136 nozzles (vertically-lined) Y, M, C (24 nozzles × 3) + Bk (64 nozzles)	
Ink color	Yellow, Magenta, Cyan, Black	
No. of pages printed	Approx. 23 pages	(HQ mode / black cartridge) (7.5% duty per color pattern) (30% print duty)
	Approx. 30 pages	(HQ mode / color cartridge) (7.5% duty per color pattern) (30% print duty)
Weight	Approx. 29g	(including black and color ink cartridge)

2) BC-10

Type	Ink cartridge replaceable type of black BJ cartridge	
Print head	128 nozzles (vertically-lined)	
Ink color	Black	
No. of pages printed	Approx. 140 pages	(HQ mode) / cartridge (1500-character pattern)
	Approx. 280 pages	(HS mode) / cartridge
Weight	Approx. 26g	(including black ink cartridge)

17. Detection functions

Paper-out	Available
Paper width	Not available
Home position	Available
BJ cartridge	Available
Ink cartridge	Not available
Remaining ink level	Available (Default: None)
BJ cartridge identification	Available
Waste ink amount	Available
Paper delivery	Available

18. Acoustic noise level

Approx. 45 dB (A) or less during operation
Sound pressure level: According to ISO 9296

19. Environmental requirements

	During operation	During storage
Temperature	5°C to 35°C (41°F to 95°F)	0°C to 35°C (32°F to 95°F)
Humidity	10% to 90%RH (no condensation)	5% to 95%RH (no condensation)

20. Power supply [using the Universal adaptor (AD-360U)]

	Voltage/Frequency	Power Consumption	Stand-by Status	Recharging
USA/Canada	AC120V, 60 Hz	Max. 30W	Max. 5W	Max. 10W
UK/Australia	AC240V, 50 Hz			
Europe	AC230V, 50 Hz			

21. External dimensions

300 mm (11.8") W × 112.5 mm (4.4") D × 49 mm (1.9") H

22. Weight

Approx. 0.9 kg (2.0lbs) (including lithium ion battery)

2.2 Paper Specifications

1. Paper size

Letter (8.5" × 11")
Legal (8.5" × 14")
A4 (210 mm × 297 mm)
A5 (148.5 mm × 210 mm)
B5 (182 mm × 257 mm)
Commercial number 10 envelope (4.1" × 9.5")
European DL-size (220 mm × 110 mm)

2. Paper type

Plain paper
Coated paper (Canon coated paper LC-101/HR-101, A4/LTR)
Envelope (Commercial number 10 or DL-size)
Transparency (Canon transparency film CF-102, A4/LTR)
BPF (Canon back print film BF-102, A4/LTR)
Glossy paper (Canon glossy paper GP-201, A4/LTR)
Glossy film (Canon glossy film HG-101, A4/LTR)
BJ cloth (Canon BJ cloth, FS-101)
(Do not use fanfold paper and labels.)

3. Print paper

Type	Paper	Size	Manual Sheet Feed		Remarks
			Vertical	Horizontal	
Plain paper	PB-SK*	A4, B5	○		Suggested paper
	PB-SK*	A4, B5	○		Suggested paper
	Kangas	A4	○		
	Neusiedler	A4	○		
	Boise Cascade	LTR, LGL	○		
	XX4024 (75g/m²)	LTR, LGL	▲		
	XX4024 (90g/m²)	LTR, LGL	▲		
	Plover Bond	LTR, LGL	▲		
Envelope	COM#10	240 × 106 (mm)	▲		Mailwell No.582
	DL-size	240 × 110 (mm)	▲		Chapman
Transparency film	CF-102	A4, LTR	▲		OHP film
Thick paper	91 to 105g/m²				
Coated paper	LC-101/HR-101	A4, LTR	▲		
BPF	BF-102	A4, LTR	▲		
Glossy paper	GP-201	A4, LTR	▲		
Glossy film	HG-101	A4, LTR	▲		
BJ cloth	FS-101		▲		

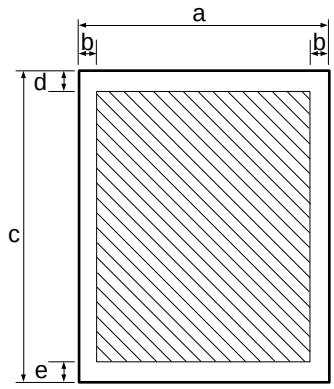
○ : Usable ▲: Usable (However, print quality and feedability may be deteriorated.)
(Blank): Not usable
*PB : PPC & BJ

Manual paper feed at all times one page at a time.

4. Printing range

1) Plain paper and special media

The shaded position in the following figure shows the recommended printing area for papers and special media. The printer's mechanical printing area is inside the 3 mm top/bottom margins. We recommend setting the margins greater than 22 mm, however, because the print quality degrades below this.



Printable Area

A4 size				Letter size				Legal size			
a	210	mm	8.3"	a	216	mm	8.5"	a	216	mm	8.5"
b	3.4	mm	0.13"	b	6.4	mm	0.25"	b	6.4	mm	0.25"
c	297	mm	11.7"	c	279	mm	11.0"	c	356	mm	14.0"
d	3	mm	0.12"	d	3	mm	0.12"	d	3	mm	0.12"
e	3	mm	0.12"	e	3	mm	0.3"	e	7.6	mm	0.3"

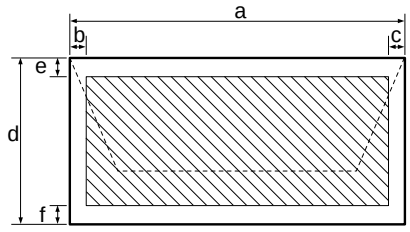
Recommended Printing Area

A4 size				Letter size				Legal size			
a	210	mm	8.3"	a	216	mm	8.5"	a	216	mm	8.5"
b	3.4	mm	0.13"	b	6.4	mm	0.25"	b	6.4	mm	0.25"
c	297	mm	11.7"	c	279	mm	11.0"	c	356	mm	14.0"
d	22	mm	0.87"	d	22	mm	0.87"	d	22	mm	0.87"
e	22	mm	0.87"	e	22	mm	0.87"	e	22	mm	0.87"

Figure 2-10 Printing Area

2) Envelope

The shaded portion in the following figure shows the recommended printing area for a U.S. Commercial 10 envelope (9.5 × 4.1 inches) and an European DL-size envelope (229 × 110 mm).



Printable Area

European DL				U.S. Commercial number 10			
a	220	mm	8.7"	a	241	mm	9.5"
b	6.4	mm	0.25"	b	6.4	mm	0.25"
c	10.4	mm	0.41"	c	31.4	mm	1.2"
d	110	mm	4.3"	d	104	mm	4.1"
e	3	mm	0.12"	e	3	mm	0.12"
f	3	mm	0.12"	f	3	mm	0.12"

Recommended Area

European DL				U.S. Commercial number 10			
a	220	mm	8.7"	a	241	mm	9.5"
b	6.4	mm	0.25"	b	6.4	mm	0.25"
c	10.4	mm	0.41"	c	31.4	mm	1.2"
d	110	mm	4.3"	d	104	mm	4.1"
e	22	mm	0.87"	e	22	mm	0.87"
f	22	mm	0.87"	f	22	mm	0.87"

Figure 2-11 Printing Area (Envelope)

2.3 Interface Specifications

2.3.1 Parallel interface

1) Interface Type: Bidirectional Centronics Interface (IEEE 1284 compatible)

2) Operation mode: Compatibility mode / Nibble mode / ECP mode

3) Signal voltage levels:

	Input	Output
Low	0.0 V to +0.8 V	0.0V to +0.4 V
High	+2.0 V to +5.0 V	+2.4 V to +5.5 V

4) Input / output Each signal pulled up with +5V.

5) Interface cable: Type: Twisted-pair shielded cable
Material: AWG28 or larger
Length: Up to 1.5 m (4.9 feet)

6) Interface connectors: Printer side: Japan Molex 52629-2611 (or equivalent)
Cable side: Fujitsu Takamizawa Components FCN-287P026-G/E(or equivalent)

Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	$\overline{\text{STROBE}}$	IN	14	GND	–
2	DATA1	IN/OUT	15	SELECT	OUT
3	DATA2	IN/OUT	16	$\overline{\text{AUTO FEED XT}}$	IN
4	DATA3	IN/OUT	17	+5.0V (*1)	–
5	DATA4	IN/OUT	18	$\overline{\text{INIT}}$	IN
6	DATA5	IN/OUT	19	$\overline{\text{ERROR}}$	OUT
7	DATA6	IN/OUT	20	+5.0V (*3)	–
8	DATA7	IN/OUT	21	$\overline{\text{SELECT IN}}$	IN
9	DATA8	IN/OUT	22	GND	–
10	$\overline{\text{ACKNLG}}$	OUT	23	N.C.	–
11	BUSY	OUT	24	GND	–
12	P.E.	–	25	GND	–
13	GND	–	26	N.C.	–

7) Input / output signals and pin layout

*1. The level is raised to +5.0V at 390.
*2. N.C. means no connection.
*3. The level is raised to +5.0V at 5.6k.

8) Input / output signals

● **COMPATIBILITY MODE**

$\overline{\text{STROBE}}$ [Input]:

When the printer receives the $\overline{\text{STROBE}}$ signal low pulse width must be greater than 1.0 µs from the computer, the printer reads the data from the interface and sets the BUSY signal high.

DATA 1-8 [Input]:

These signals are the 8 bits of parallel data sent from the computer. A high level indicates a logical 1; a low level indicates a logical 0. The printer reads the DATA signals when a $\overline{\text{STROBE}}$ signal is received.

$\overline{\text{ACKNLG}}$ [Output]:

The $\overline{\text{ACKNLG}}$ signal tells the computer that the data from the previous $\overline{\text{STROBE}}$ signal has been read. The computer does not release the next $\overline{\text{STROBE}}$ signal unless this signal is outputted.

BUSY [Output]:

When the printer sets BUSY signal high, it cannot receive data. The BUSY signal goes high in response to a $\overline{\text{STROBE}}$ signal. This signal remains high until the data is read.

BUSY signal is also high when:

Data is received.

Receive buffer is full of data.

A printer error condition such as out-of-paper, paper jamming, etc., has occurred.

P.E. [Output]:

The printer sets Paper End signal high when it determines that it has run out of the paper or that a paper jam has occurred. PE signal remains high until the operator loads paper and presses the *RESUME* button. PE remains unchanged after paper jamming.

SELECT [Output]:

In BJ mode

When the printer is ready, it sets the SELECT signal high.

In LQ mode

The SELECT signal is always high (pulled up to +5V).

$\overline{\text{AUTO FEED XT}}$ [Input]:

This signal is ignored at all time.

$\overline{\text{INIT}}$ [Input]:

$\overline{\text{INIT}}$ signal from the system resets the printer to its initial power-on state. In BJ mode, the BUSY signal goes high, and any received data is printed. In LQ mode, the BUSY signal goes high, and the print buffer is cleared. When $\overline{\text{INIT}}$ signal goes low, the printer resets to the power-on default state. $\overline{\text{INIT}}$ signal pulse width must be greater than 50ms from the printer.

The status at start-up is as follows:

Carriage returns to home position.

Function setting reverts back to the initial power-on state.

$\overline{\text{ERROR}}$ [Output]:
The printer sets the $\overline{\text{ERROR}}$ signal low if the printer detects an error or out-of-paper condition.

$\overline{\text{SELECT IN}}$ [Input]:
The DC1 and DC3 control codes become valid when this signal is high and invalid at low. The signal level is detected only when the printer is powered on and when the $\overline{\text{INIT}}$ signal is initialized.

● **NIBBLE MODE**

$\overline{\text{STROBE}}$ [Input] (Host Clk):
STROBE signal is always high to prevent the printer from reading data.

DATA 1-8 [Input] (Data 1-8):
Not used

$\overline{\text{INIT}}$ [Input] :
Not used

$\overline{\text{AUTOFEED XT}}$ [Input] (Host Busy):
A low signal indicates that data can be received. This signal is high after data is received.

$\overline{\text{SELECT IN}}$ [Input] (1284 Active):
$\overline{\text{SELECT IN}}$ signal is high at the beginning of negotiation and remains high throughout the nibble mode. This indicates that the printer is operating under bidirectional mode. After completing the nibble mode, $\overline{\text{SELECT IN}}$ signal is low.

$\overline{\text{ACKNLG}}$ [Output] (Ptr Clk):
By lowering $\overline{\text{ACKNLG}}$ signal, the printer informs the computer that the data has been outputted. When the $\overline{\text{AUTO FEED XT}}$ signal from the host computer is raised to high, $\overline{\text{ACKNLG}}$ signal responds by becoming high.

BUSY [Output] (Ptr Busy):
BUSY signal outputs data to the host computer. The third bit byte data is outputted first, followed by the seventh data.

P.E. [Output] (AckData Req):
PE signal outputs data to the host computer. The second bit byte data is outputted first, followed by the sixth data.

SELECT [Output] (X flag):
SELECT signal outputs data to the host computer. The first bit byte data is outputted first, followed by the fifth data.

$\overline{\text{ERROR}}$ [Output] (Data Avail):
ERROR signal outputs data to the host computer. The 0 bit byte data is outputted first, followed by the fourth data.

● **ECP MODE**

$\overline{\text{STROBE}}$ [Input] (Host Clk):
$\overline{\text{STROBE}}$ signal handshakes with the BUSY signal (Periph Ack) to transmit data from the computer to the printer during the forward phase. When $\overline{\text{STROBE}}$ signal is low, it indicates that data has been sent to data bus. Reverse phase is always high.

DATA 1~8 [Input]:
When the host computer outputs data during the forward phase, DATA signal is input signal. When the printer outputs data to the host computer during the reverse phase, DATA signal is output signal.

$\overline{\text{INIT}}$ [Input] (Reverse Req):
$\overline{\text{INIT}}$ signal is set to low to perform a recovery process of the data sent from the host computer during the forward phase. $\overline{\text{INIT}}$ signal responds to the low PE signal and becomes high. $\overline{\text{INIT}}$ signal is lowered when the forward phase idle is switched to the reverse phase. When the reverse phase is switched to forward phase, $\overline{\text{INIT}}$ signal is raised to high.

$\overline{\text{AUTO FEED XT}}$ [Input] (Host Busy):
During the forward phase, the $\overline{\text{AUTO FEED XT}}$ signal on data bus indicates whether the information is in a data or command form.
Low: Command form
High: Data form

$\overline{\text{SELECT IN}}$ [Input] (1284 Active):
$\overline{\text{SELECT IN}}$ signal is high at the beginning of negotiation and remains high during the ECP mode. This indicates that the printer is operating under bidirectional mode. After completing the ECP mode, $\overline{\text{SELECT IN}}$ signal is low.

$\overline{\text{ACKNLG}}$ [Output]:
The $\overline{\text{ACKNLG}}$ signal is always high during the forward phase. During the reverse phase, $\overline{\text{ACKNLG}}$ signal is low to indicate data has been outputted from the host computer to the data bus. $\overline{\text{ACKNLG}}$ signal responds high to the host computer's $\overline{\text{AUTO FEED XT}}$ signal high signal.

P.E. [Output] (AckReverse):
PE signal is always high during the forward phase and it is always low during the reverse phase. PE signal is lowered in response to the host computer's low $\overline{\text{INIT}}$ signal to confirm the request to transfer from the forward phase to the reverse phase.

SELECT [Output] (X flag):
SELECT signal is always high.

ERROR [Output] (Periph Req):
If there is still data to be transferred in the host computer, a low ERROR signal is released to request reverse phase.

BUSY [Output] (PeriphAck):
During the forward phase, BUSY signal is low if the computer can send data. Once the data has been outputted BUSY signal becomes high. During the reverse phase, the form of data sent from the printer to the data bus is shown as follows:
Low: Command form
High: Data form

9) Timing

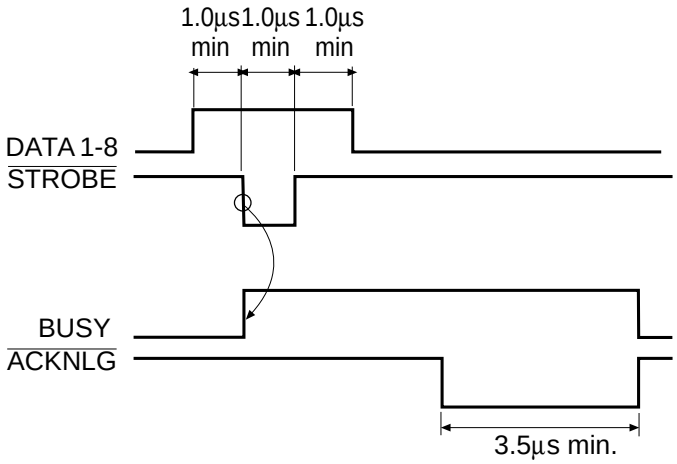


Figure 2-12 Timing Chart (Compatibility Mode)

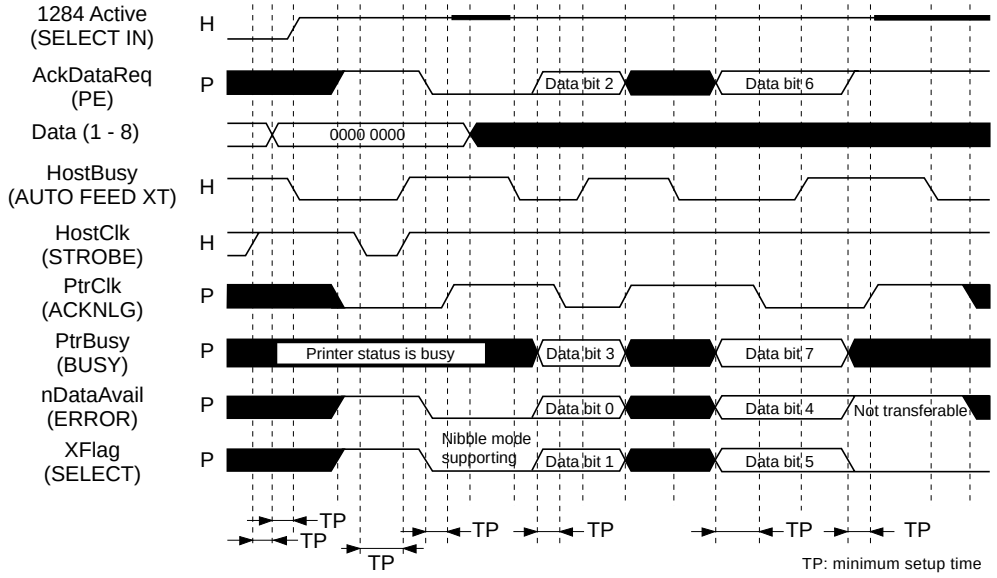


Figure 2-13 Timing Chart (Nibble Mode)

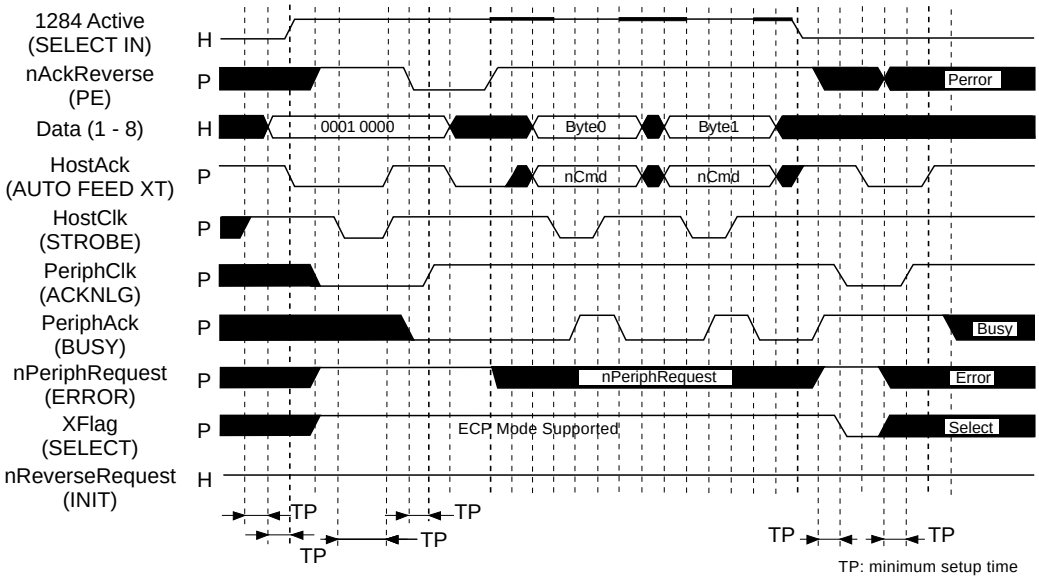


Figure 2-14 Timing Chart (ECP Mode)

2.3.2 Infrared interface

1. IrDA Interface

1) Interface

IrDA Version 1.0 compatible

2) Optical specifications

Light generation

Wavelength:	0.85 to 0.90 µm
Intensity:	40 to 500 mW/Sr
Light angle:	±15° to 30° (along optical axis)

Light interception

Wavelength:	0.85 to 0.90 µm
Intensity:	4µW/cm^2 to 500 mW/cm^2
Light angle:	Max ± 15° (along optical axis)

3) Transfer speed

9600/19200/38400/57600/115200 bps

4) Communication method

Half duplex, start/stop system (bidirectional)

5) Communication distance

0 to 1 m

6) Maximum received data size

2048 byte/packet

7) Modulation method

3/16 RZI (Return to Zero Invert)

8) Received signal

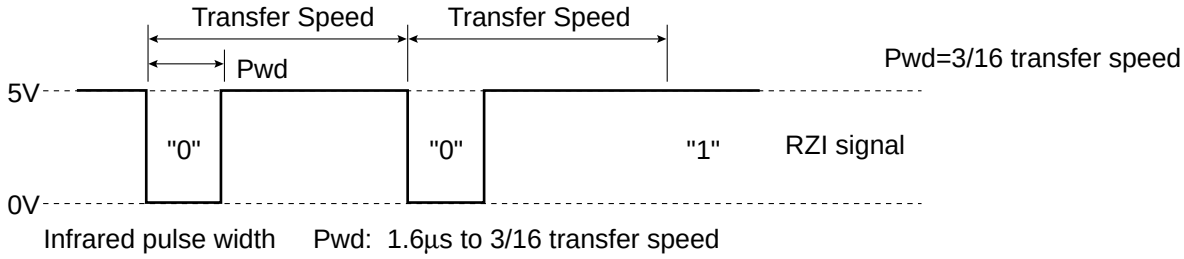


Figure 2-15 IrDA Method

2. ASK Interface

1) Interface

SHARP Liquid Crystal Pen Computer: ZAURUS compatible

2) Optical specifications

Light generation

Wavelength:	0.85 to 0.90 µm
Intensity:	40 to 500 mW/Sr
Light angle:	±15° to 30° (along optical axis)

Light interception

Wavelength:	0.85 to 0.90 µm
Intensity:	4 mW/cm^2 to 500 mW/cm^2
Light angle:	Max ± 15° (along optical axis)

3) Transfer speed

9600 bps

4) Communication method

Half duplex, start/stop system (unidirectional)

5) Communication distance

Approx. less than 30 cm

6) Maximum received data size

512 byte/block

7) Modulation method

ASK (Amplitude Shift Keying) Method (carrier: 500 kHz)

8) Received signal

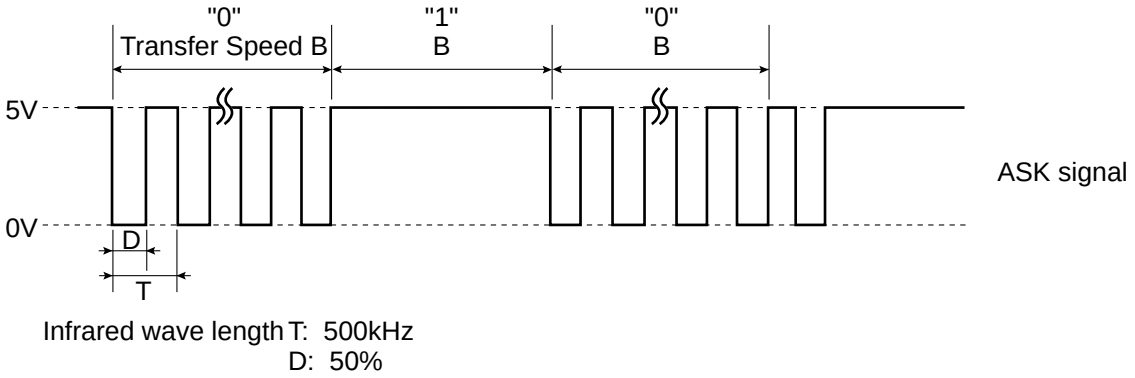


Figure 2-16 ASK Method

2.4 Character Code Tables

Code page 437

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	ß 225	± 241	0001
2	☻ 2	↕ 18	” 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	■ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	a 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	• 7	↨ 23	’ 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	o 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	2 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pts 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ƒ 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 850

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	ð 208	Ó 224	- 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	Đ 209	ß 225	± 241	0001
2	☻ 2	↕ 18	” 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	■ 178	┬ 194	Ê 210	Ô 226	= 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	a 166	Â 182	ã 198	Í 214	µ 230	÷ 246	0110
7	• 7	↨ 23	’ 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	o 167	À 183	Ã 199	Î 215	þ 231	¸ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ø 157	¡ 173	¢ 189	═ 205	▌ 221	Ý 237	² 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	× 158	<< 174	¥ 190	╬ 206	▐ 222	ì 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ƒ 159	>> 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 860

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	À 145	í 161	▓ 177	┴ 193	╤ 209	ß 225	± 241	0001
2	☻ 2	↕ 18	” 34	2 50	B 66	R 82	b 98	r 114	é 130	È 146	ó 162	■ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ã 132	õ 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	Á 134	Ú 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	• 7	↨ 23	’ 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	Ì 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	Ê 137	Õ 153	Ò 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	Í 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	Ô 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ù 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	2 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ã 142	Pt 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Â 143	Ó 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 863

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	⏐ 160	▒ 176	└ 192	╨ 208	α 224	≡ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	È 145	´ 161	▓ 177	┴ 193	╤ 209	ß 225	± 241	0001
2	☻ 2	↕ 18	” 34	2 50	B 66	R 82	b 98	r 114	é 130	Ê 146	ó 162	■ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	Â 132	Ë 148	¨ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	Ï 149	¸ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	¶ 134	û 150	ɜ 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	• 7	↨ 23	’ 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	¯ 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	¤ 152	Î 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ô 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	= 141	Ù 157	¾ 173	╜ 189	═ 205	▌ 221	∅ 237	2 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	À 142	Û 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	§ 143	ƒ 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 865

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	╨ 208	α 224	≡ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	╤ 209	ß 225	± 241	0001
2	☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	■ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	a 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	o 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	n 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ø 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	2 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pts 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ƒ 159	¤ 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 857

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	o 208	Ó 224	– 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▓ 177	┴ 193	a 209	ß 225	± 241	0001
2	☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	■ 178	┬ 194	Ê 210	Ô 226	242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	Á 181	┼ 197	213	Õ 229	§ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	Ğ 166	Â 182	ã 198	Í 214	µ 230	÷ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	ğ 167	À 183	Ã 199	Î 215	231	¸ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	İ 152	¿ 168	© 184	╚ 200	ï 216	× 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ì 236	³ 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	ı 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	ÿ 237	² 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Ş 158	<< 174	¥ 190	╬ 206	Ì 222	— 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ş 159	>> 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 855

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	ђ 128	ЂЂ 144	а 160	▒ 176	└ 192	Б 208	Я 224	- 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	Ђ 129	Ѓ 145	А 161	▓ 177	┴ 193	Л 209	р 225	ы 241	0001
2	☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	ѓ 130	њ 146	б 162	■ 178	┬ 194	В 210	Р 226	Ы 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	Ѓ 131	Њ 147	Б 163	│ 179	├ 195	М 211	с 227	з 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ё 132	ћ 148	ц 164	┤ 180	─ 196	Г 212	С 228	З 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	Ё 133	Ћ 149	Ц 165	х 181	┼ 197	Н 213	т 229	ш 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	є 134	ќ 150	д 166	Х 182	к 198	З 214	Т 230	Ш 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	Є 135	Ќ 151	Д 167	и 183	К 199	О 215	у 231	э 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	s 136	ў 152	е 168	И 184	╚ 200	п 216	У 232	Э 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	S 137	Ў 153	Е 169	╣ 185	╔ 201	┘ 217	ж 233	щ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	i 138	ц 154	ф 170	║ 186	╩ 202	┌ 218	Ж 234	Щ 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	I 139	Ц 155	Ф 171	╗ 187	╦ 203	█ 219	в 235	ч 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	I 124	ї 140	ю 156	г 172	╝ 188	╠ 204	▄ 220	В 236	Ч 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	Ї 141	Ю 157	Г 173	й 189	═ 205	П 221	ь 237	§ 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	j 142	ъ 158	<< 174	Й 190	╬ 206	я 222	Ь 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	J 143	Ъ 159	>> 175	┐ 191	¤ 207	▀ 223	№ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 852

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	▒ 176	└ 192	đ 208	Ó 224	˗ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	Ĺ 145	í 161	▓ 177	┴ 193	Đ 209	ß 225	˝ 241	0001
2	☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Í 146	ó 162	■ 178	┬ 194	Ď 210	Ô 226	˛ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ń 227	ˇ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	Ą 164	┤ 180	─ 196	ď 212	ń 228	˘ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	ů 133	Ľ 149	ą 165	Á 181	┼ 197	Ň 213	ň 229	§ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	ć 134	ľ 150	Ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	¸ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ł 136	ś 152	Ę 168	Ş 184	╚ 200	ě 216	Ŕ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	ę 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	Ő 138	Ü 154	170	║ 186	╩ 202	┌ 218	ŕ 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ő 139	Ť 155	ź 171	╗ 187	╦ 203	█ 219	Ű 235	ű 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	I 124	î 140	ť 156	Č 172	╝ 188	╠ 204	▄ 220	ý 236	Ř 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	Ź 141	Ł 157	ş 173	Ž 189	═ 205	Ţ 221	Ý 237	ř 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	× 158	<< 174	ž 190	╬ 206	Ů 222	ţ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Ć 143	č 159	>> 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 864

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	° 128	ß 144	160	٠ 176	¢ 192	د 208	ـَ 224	ّ 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	· 129	∞ 145	ـِ 161	ا 177	ء 193	ر 209	ف 225	ّ 241	0001
2	♪ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	• 130	∅ 146	آ 162	٢ 178	Â 194	ز 210	ق 226	ن 242	0010
3	♫ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	√ 131	± 147	£ 163	٣ 179	أ 195	س 211	ك 227	ه 243	0011
4	☼ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	■ 132	½ 148	¤ 164	ع 180	ؤ 196	ش 212	ل 228	ـهـ 244	0100
5	═ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	— 133	¼ 149	إ 165	ى 181	ع 197	ص 213	م 229	ب 245	0101
6	‖ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	▏ 134	≈ 150	166	آ 182	ت 198	ض 214	ن 230	ي 246	0110
7	╪ 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	┼ 135	<< 151	167	٧ 183	ا 199	ط 215	هـ 231	ـهـ 247	0111
8	╡ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	┤ 136	>> 152	ب 168	٨ 184	ب 200	ظ 216	و 232	ق 248	1000
9	╤ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	┬ 137	لأ 153	ب 169	٩ 185	ة 201	ع 217	ى 233	لا 249	1001
A	╞ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	├ 138	لأ 154	ت 170	ف 186	ت 202	غ 218	ـپـ 234	لأ 250	1010
B	╧ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	┴ 139	155	ث 171	؛ 187	ث 203	إ 219	ض 235	ـا 251	1011
C	╕ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	∣ 124	┐ 140	156	، 172	س 188	ج 204	¬ 220	ـه 236	ث 252	1100
D	╒ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	┌ 141	لا 157	ج 173	ش 189	ح 205	÷ 221	غ 237	ي 253	1101
E	╘ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	└ 142	لا 158	ح 174	ص 190	خ 206	× 222	ـغـ 238	■ 254	1110
F	╛ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	┘ 143	ـ 159	خ 175	؟ 191	د 207	ـع 223	م 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Code page 869

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	▶ 16	SP 32	0 48	@ 64	P 80	` 96	p 112	128	΄Ι 144	ϊ 160	▒ 176	└ 192	Τ 208	ζ 224	– 240	0000
1	☺ 1	◀ 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	Ϊ 145	΄ι 161	▒ 177	┴ 193	Υ 209	η 225	± 241	0001
2	☻ 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	130	Ό 146	ό 162	▓ 178	┬ 194	Φ 210	θ 226	υ 242	0010
3	♥ 3	!! 19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	ύ 163	┃ 179	├ 195	Χ 211	ι 227	φ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	148	Α 164	┤ 180	─ 196	Ψ 212	κ 228	χ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	133	Υ 149	Β 165	Κ 181	┼ 197	Ω 213	λ 229	§ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	Ά 134	Ÿ 150	Γ 166	Λ 182	Π 198	α 214	μ 230	ψ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	135	© 151	Δ 167	Μ 183	Ρ 199	β 215	ν 231	΄ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	· 136	Ώ 152	Ε 168	Ν 184	╚ 200	γ 216	ξ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	¬ 137	² 153	Ζ 169	╣ 185	╔ 201	┘ 217	ο 233	¨ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	¦ 138	³ 154	Η 170	║ 186	╩ 202	┌ 218	π 234	ω 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	΄ 139	ά 155	½ 171	╗ 187	╦ 203	■ 219	ρ 235	ϋ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	∣ 124	, 140	£ 156	Θ 172	╝ 188	╠ 204	▄ 220	σ 236	ύ 252	1100
D	♪ 13	↔ 29	– 45	= 61	M 77	] 93	m 109	} 125	Έ 141	έ 157	Ι 173	Ξ 189	═ 205	δ 221	ς 237	ώ 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	― 142	ή 158	<< 174	Ο 190	╬ 206	ε 222	τ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Ή 143	ί 159	>> 175	┐ 191	Σ 207	▀ 223	΄ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Part 3

OPERATING INSTRUCTIONS

Page	
3 - 1	1. PRINTER SETUP
3 - 1	1.1 Unpacking
3 - 2	1.2 Installation
3 -10	1.3 Names and Functions of Parts
3 -11	2. TRANSPORTING THE PRINTER
3 -11	2.1 Carrying the Printer
3 -11	2.2 Transporting the Printer
3 -12	3. PRINTER SERVICING FUNCTIONS
3 -12	3.1 Error Indications
3 -15	3.2 Function Setting
3 -16	3.3 Control Buttons
3 -17	3.4 Self Test Print
3 -22	3.5 Hexadecimal Dump Test Print
3 -23	3.6 EEPROM Data Setting
3 -26	3.7 Rewriting Flash ROM

1. PRINTER SETUP

1.1 Unpacking

After unpacking, check that you have the following:

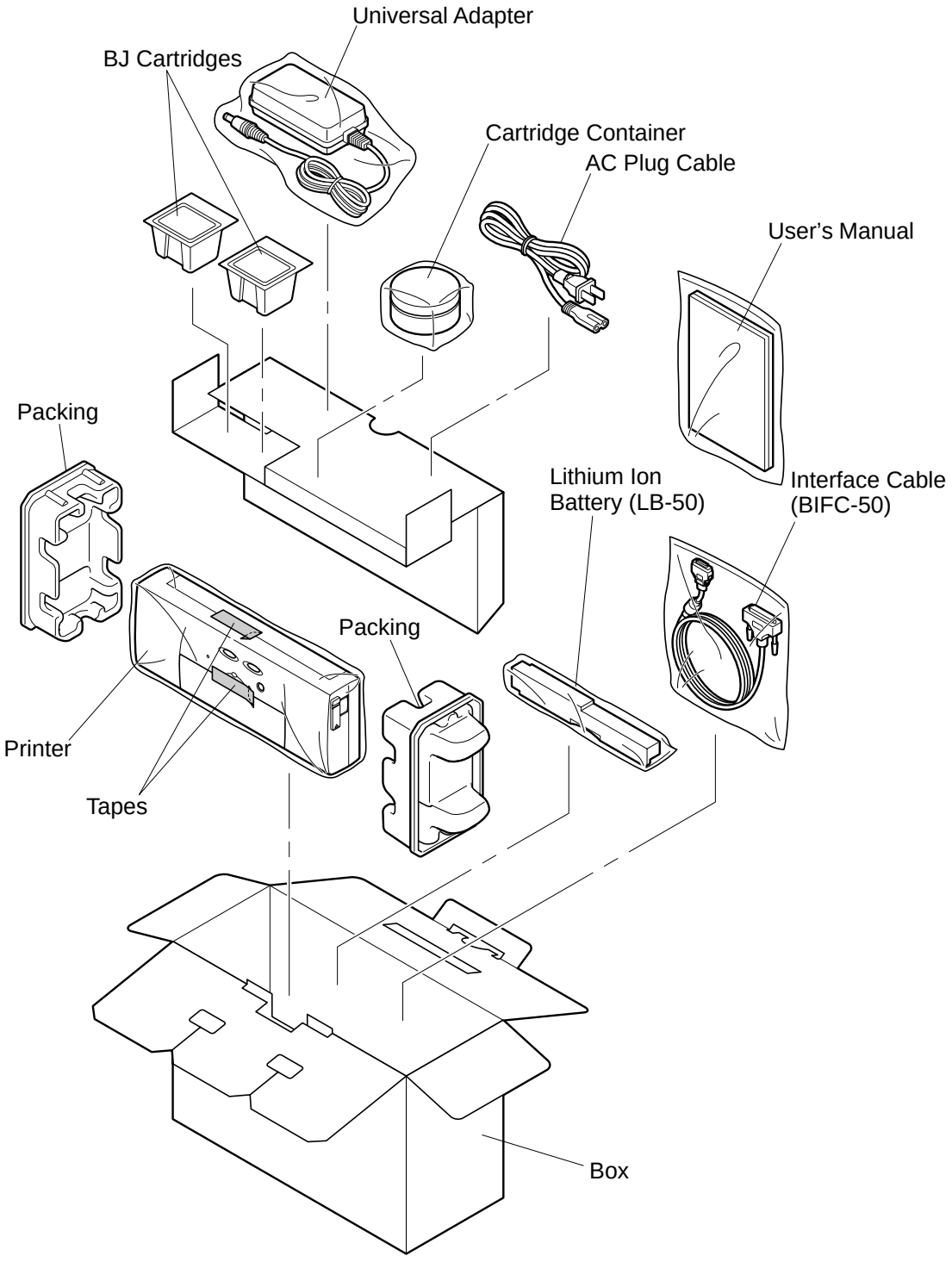


Figure 3-1 Packing Arrangement

1.2 Installation

1.2.1 Installation space

Install the printer with the clearances given below for the printer to be operated efficiently. The spaces required to install the printer are shown below.

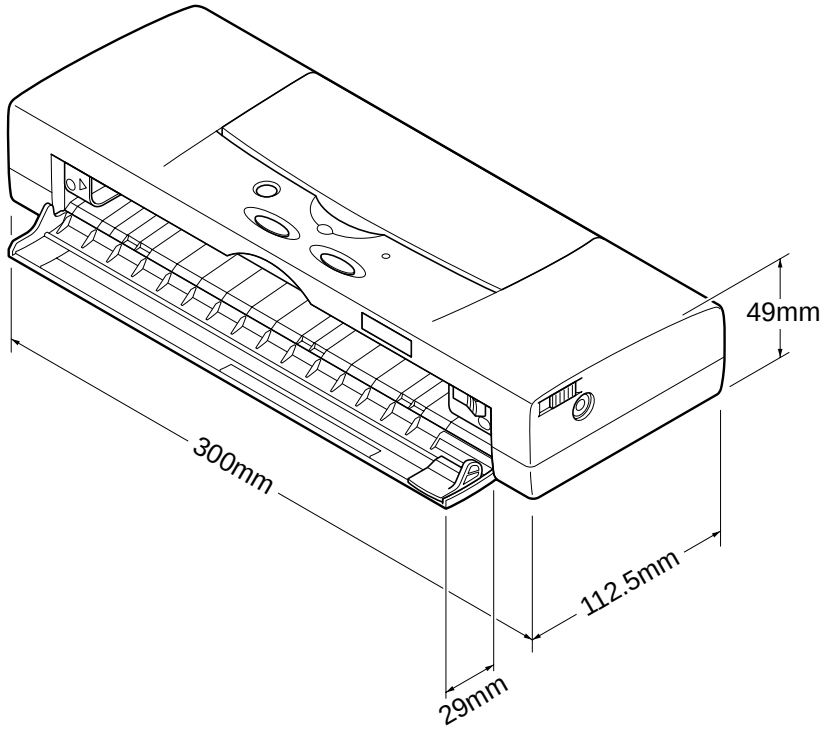


Figure 3-2 Installation Space

NOTE

- Use the printer within the following ranges of temperature and humidity:
  Ambient temperature: 5 °C to 35 °C
  Relative humidity: 10% to 90% (without condensation)
- Install the printer on a flat sturdy surface. Do not install it in places where it is subjected to vibration.
- Do not install the printer in places where it is exposed to direct sunlight or near a heater or air conditioner where the temperature changes greatly. Do not leave the printer in a car where the temperature rises suddenly.
- Do not install the printer in places where dust accumulates or it is subjected to salty wind.
- Do not place it near a television set, speaker, or other devices which generate magnetic fields.

1.2.2 Installation procedure

a) Connecting the Universal adapter

Insert the DC plug into the Universal adapter connector of the printer and the AC plug of the Universal adapter into the outlet. Mount the lithium ion battery on the printer.

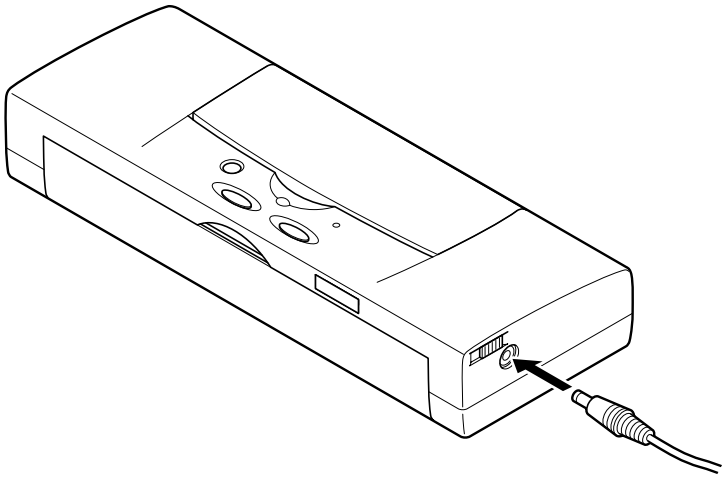


Figure 3-3 Connecting the Universal Adapter

NOTE

A printer powered with the Universal adapter or the lithium ion battery automatically executes the initial operation when powered on using the *POWER* button.

CAUTION

When the *RESUME* button is held down together and the Universal adapter is plugged in, the service function (EEPROM data setting mode) is activated. See *Part 3: 3.6 EEPROM Data Setting (page 3-23)* for details.

b) Connecting the interface cable

Make sure that the printer and the computer are off. Plug the interface cable into the printer interface connector. Secure the cable with connector clips. Connect the other end of the interface cable to the computer and fix it securely.

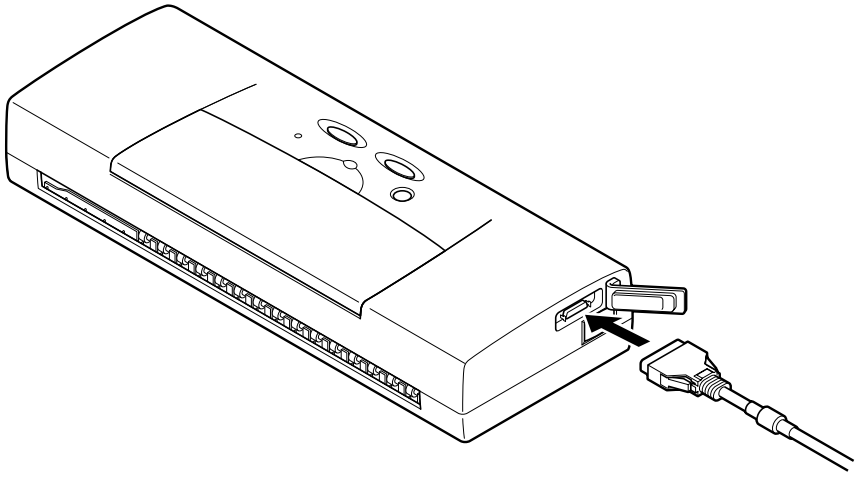


Figure 3-4 Connecting the Interface Cable

c) Connecting the Infrared interface

When transmitting data from the computer to the printer through the built-in IrDA, beware of the following:

- The printer and computer IrDA transitters should be within 1 m of each other. (Depending on the computer, infrared rays may not reach the printer's IrDA transmitter)
- The printer IrDA module angle is must be within 15 degrees of the vertical and horizontal optical axis.
- Scanning a 180dpi color A4 document with the optional scanner cartridge can take up to 30 minutes. The use of bidirectional centronics interface for data transmission is recommended.

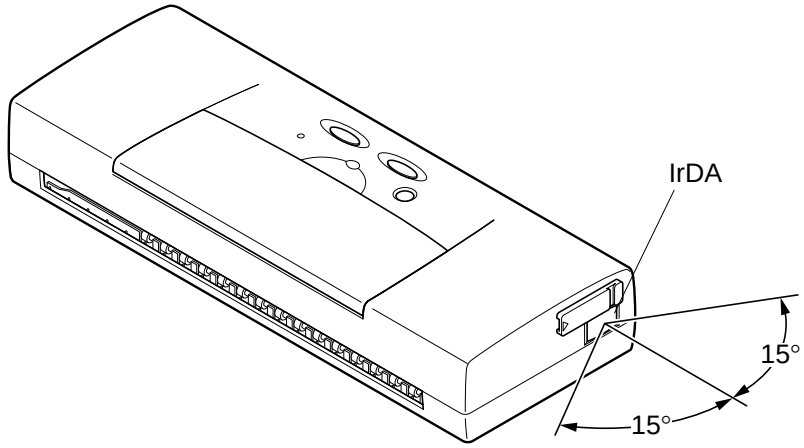


Figure 3-5 IrDA Angle of Rotation

NOTE

When both interface mediums, i.e. the bidirectional centronic interface and the IrDA, are connected, the printer automatically, switches over to the interface medium that first detects the computer signals.

d) Switching on the power

Make sure the lock switch is not locked and then press the *POWER* button to switch on the power. When the printer is powered up, it carries out the initial operation, then moves the carriage to the cartridge replacing position (center of the printer). The *POWER* indicator blinks to show that the printer is on standby with a BJ cartridge installed. Switch on the power for the equipment in this order: computer, other peripheral equipment, printer.

e) Installing the BJ cartridge

Two types of cartridges can be installed in the printer: black BJ cartridge (BC-10) and color BJ cartridge (BC-11e). The BJ cartridge BC-11 may be used however it cannot print small dots.

1) Removing the cap from the print head of the BJ cartridge

Remove the BJ cartridge from the cartridge pack, then remove the orange head cap and tape protecting the nozzles as shown in the figure below.

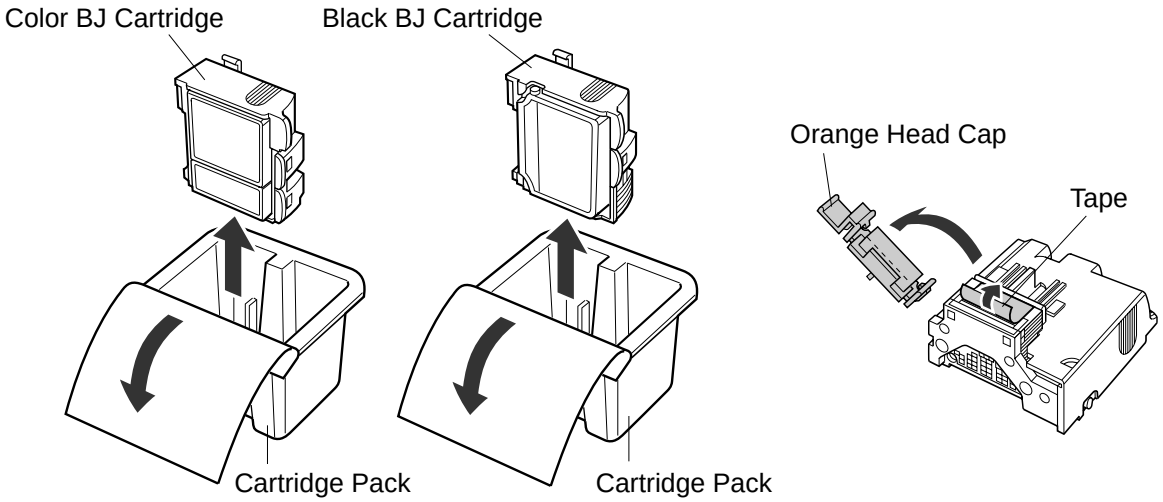


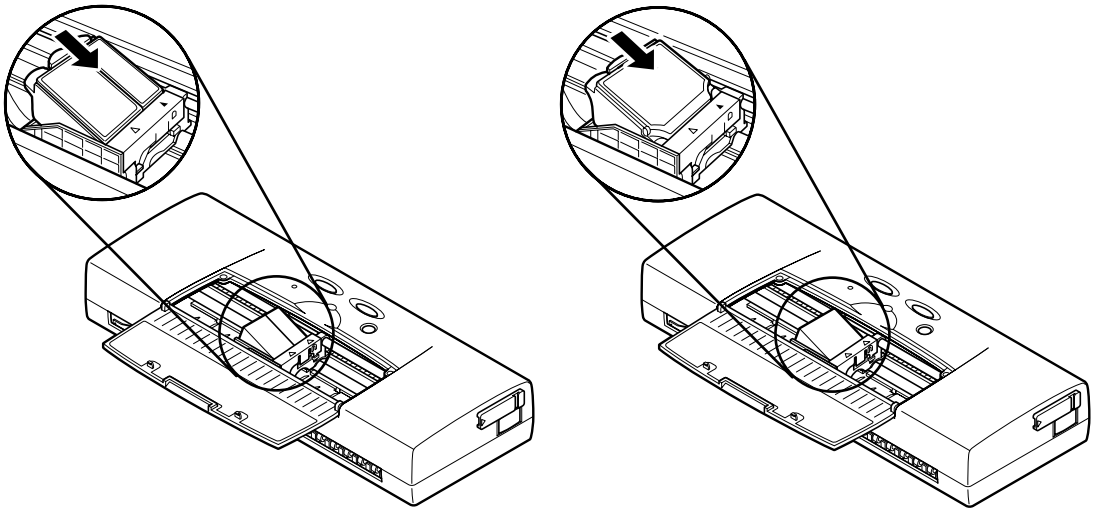
Figure 3-6 Removing the Head Cap and the Tape

CAUTION

Do not reuse a head cap and tape that have been removed once. If they are reused, the head may be clogged with foreign matter, or colors of ink may be mixed.
Peel off the tape protecting the nozzles without touching the print head. Poor printing may be caused by scratches on the printhead or any foreign object adhered to it.
After removing the cap and the tape, do not shake the BJ cartridge. Ink could splatter out if you do.

2) Installing the BJ cartridge

Open the printer head cover, and install a BJ cartridge in the carriage.
Press the *CARTRIDGE* button to return the carriage to the capping position.



Color BJ Cartridge Black BJ Cartridge

Figure 3-7 Installing the BJ Cartridge

CAUTION

If the BJ cartridge is not installed correctly, the beeper sounds once when the *CARTRIDGE* button is pressed, and the carriage cannot be returned to the capping position. If the carriage does not move to the capping position, remove and reinstall the BJ cartridge. If the error still persists, see *Part 5: 5. TROUBLESHOOTING (page 5-5)*.

3) Replacing a BJ cartridge

Open the printer head cover, press the *CARTRIDGE* button to return the carriage to the BJ cartridge replacing position (center of the printer).
Lift off the BJ cartridge. Install another BJ cartridge, press the *CARTRIDGE* button to return the carriage to the capping position. Place the removed BJ cartridge in the supplied cartridge container. (The container can contain a color or black BJ cartridge.)

CAUTION

Since the carriage is secured by the lock arm in the capping position, never pull the carriage ribbon cable to move the carriage to the center.
If the beeper sounds and the carriage does not move at all when the *CARTRIDGE* button is pressed, the BJ cartridge may have overheated. Leave the printer to cool down and wait a while before pressing the *CARTRIDGE* button again.

f) Replacing the ink cartridge

The ink cartridge of the black BJ cartridge and color BJ cartridge can be replaced. (BCI-10, BCI-11 Bk, BCI-11 color)

1) Ink cartridge replacement criteria

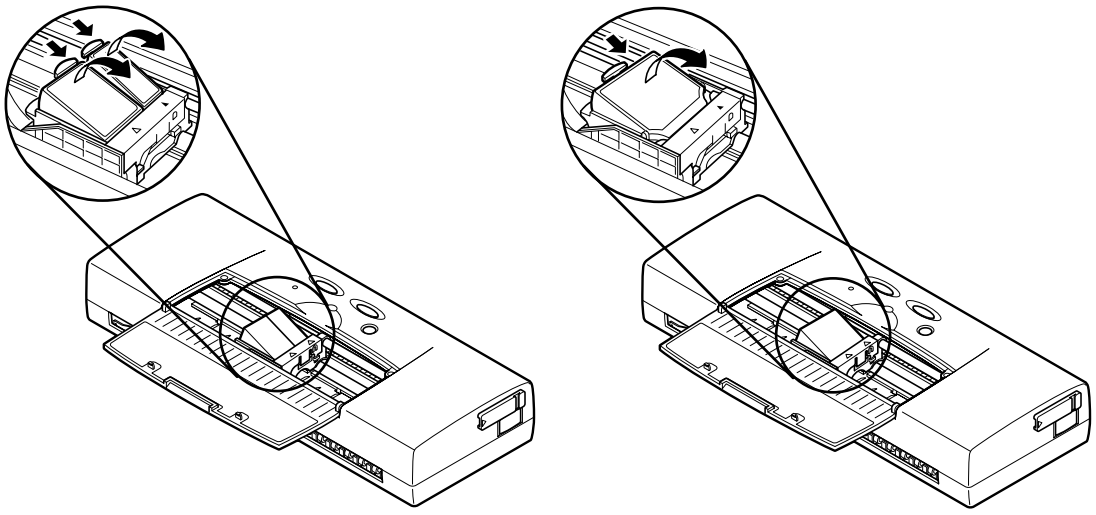
If the ink runs out or if more than six months have passed after the BJ cartridge was unsealed and the print quality is not improved by performing cleaning once or twice, the ink cartridge should be replaced with a new one. Since the color ink cartridge contains three color inks, it must be replaced if one of them runs out.

NOTE

If the print quality does not improve after replacing the ink cartridge, perform head refreshing once or twice. If the print quality does not still improve, the BJ cartridge must be replaced with a new one.

2) Removing the ink cartridge

Open the printer head cover, and press the *CARTRIDGE* button to move the carriage to the BJ cartridge replacing position. Lift off the ink cartridge while holding down its tab.



Color BJ Cartridge Black BJ Cartridge

Figure 3-8 Replacing the Ink Cartridge

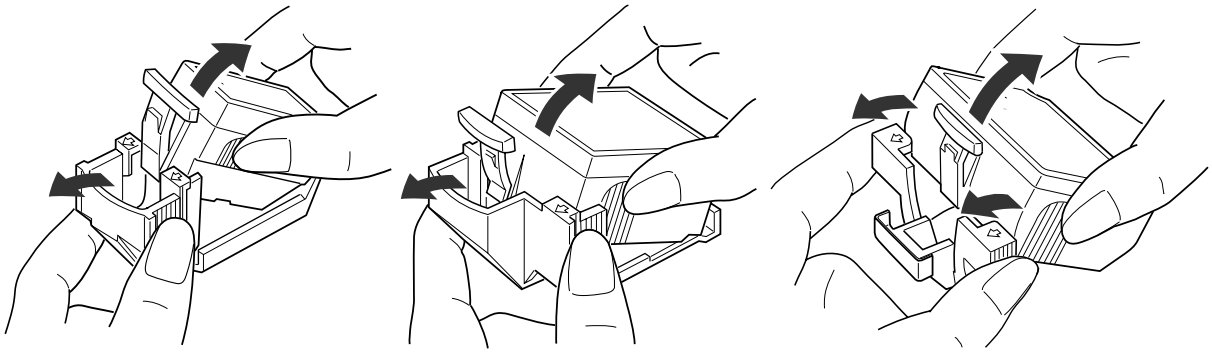
CAUTION

Ink adheres to and around the ink cartridge's ink inlet, so handle the ink cartridge carefully not to stain your hands or clothes.

3) Installing the ink cartridge

Take out the ink cartridge from its packaging, remove the protective cap for the ink inlet as shown in the figure, and install the ink cartridge in the printer with the reverse order as when removing it.

After installing the ink cartridge, press the *CARTRIDGE* button in the same way as when installing a BJ cartridge to return the carriage to the capping position.



BCI-11 Bk BCI-11 Color BCI-10 Bk

Figure 3-9 Removing the Cap (Ink Cartridge)

g) BJ cartridge container

The printer is supplied with a BJ cartridge container to contain an BJ cartridge. If the BJ cartridge is removed from the printer, place it in the container. If the BJ cartridge is not stored in the container, nozzles may be clogged with ink, the BJ head may be scratched, or the BJ cartridge does not eject the ink onto the paper. The BJ cartridge container can contain a color or black BJ cartridge.

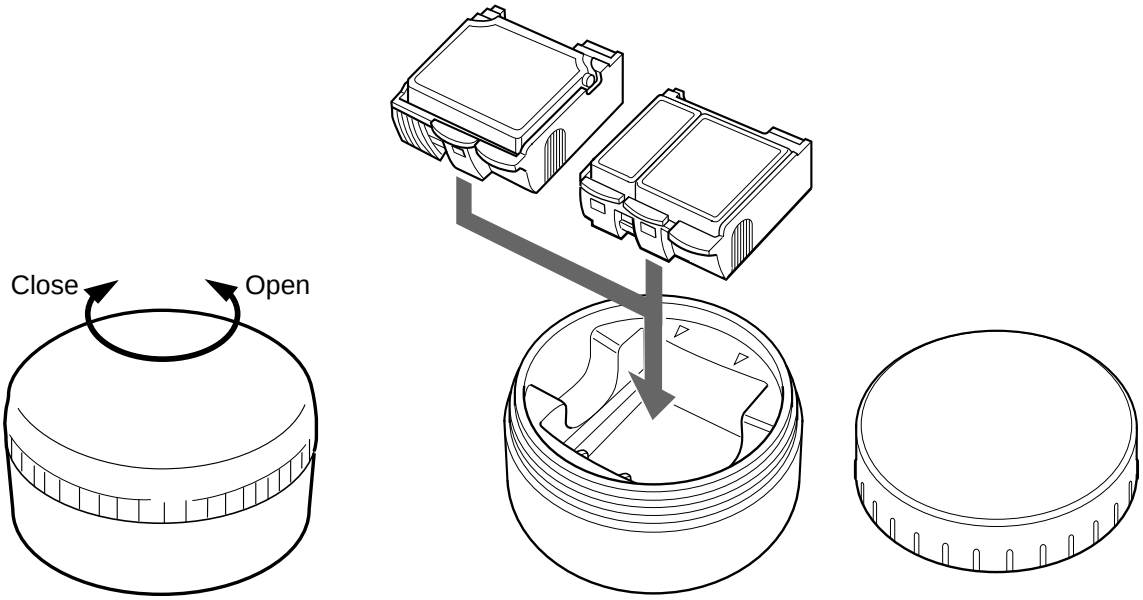


Figure 3-10 BJ Cartridge Container

CAUTION

Store the BJ cartridge with the ink cartridge attached. If the ink cartridge is not attached, ink may spill out or nozzles may be clogged with ink. Do not shake or drop the container. Otherwise, ink may leak.

h) Manual paper feeding

Open the paper feeding tray and manually feed paper one sheet at a time. Align the left side of the paper with the left side of the paper tray and slide the paper guide to keep the paper straight and prevent skewing. Make sure to insert the sheet far in until it stops. Hold the sheet until the paper feed roller grabs and feeds the sheet partially into the printer.

1.3 Names and Functions of Parts

This section describes the names of the parts of the printer and their functions.

Head Cover
Open the head cover to replace the BJ cartridge, ink cartridge or remove jammed paper.

RESUME button
Loads paper into the printer or discharges stuck paper.
Starts BJ head cleaning.

POWER button
Turns the printer on and off.

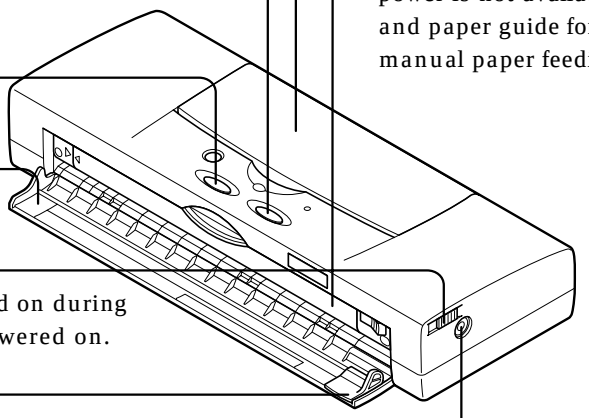
Paper Feeding Tray
Manually feed paper, one sheet at a time.

Lock Switch
Locks and prevents the printer from being powered on during tavelling. When locked the printer will not be powered on.

Paper Guide
Aligns the left edge and keeps the paper feeding straight.

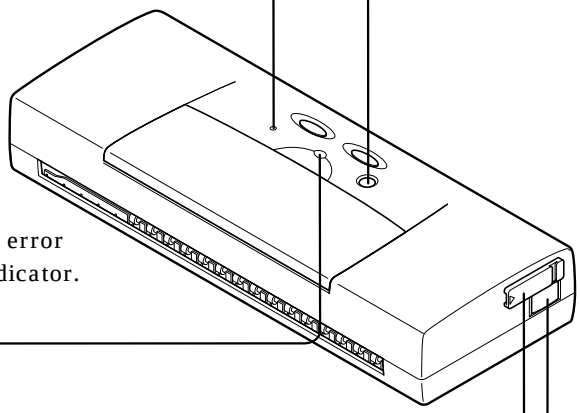
Universal Adapter Connector
Connects the DC pulg of the Universal adapter.

Lithium Ion Battery
Used both as a source of power when AC power is not available and paper guide for manual paper feeding.



CARTRIDGE Button
Used to move the cartridge to the BJ cartridge replacing position or return it to the original capping position when replacing the BJ cartridge or ink cartridge.

ERROR/CHARGE Indicator
Error when light is orange.
Displays condition of error.
Lighting: Recoverable error
Notlighting: No error
Blinking: Error or Warning
Lithium ion battery charging when light is green
Displays condition of charging.
Lighting: Charging in progress
Not lighting: Charging finished
If an internal error should occur while charging, the error indicator will be take precedence over the charging indicator.



POWER indicator
Indicates whether the printer is on line or off line.
Lighting: ON
Notlighting: OFF
Blinking: Error, Warning or Data Transmitting

Parallel Interface Connector
Connects the centronics compatible parallel interface cable to the printer. The printer connector uses a Canon exclusive small-size connector.

IrDA Module

Figure 3-11 Names and Functions of Parts

2. TRANSPORTING THE PRINTER

When carrying or transporting the printer, leave the BJ cartridge in or place it in the cartridge container to prevent ink leakage and drying of cartridge nozzles. The printer may be left installed.

2.1 Carrying the Printer

Before carrying the printer, do the following:

1) Press the *POWER* button to turn the printer off and close the top cover. When the power goes off, the display turns off.
2) Unplug the interface cable.
3) Disconnect the DC plug of the Universal adapter from the printer. Disconnect the AC plug of the Universal adapter from the outlet.
4) Make sure that the BJ cartridge is at the capping position (right edge of the printer). If it is not at the capping position, turn the printer on again and perform step 1 and subsequent steps to move the carriage to the capping position.
5) Slide the Lock switch to the lock position.

If you cut off the power to the printer by just disconnecting the Universal adapter or take out the BJ cartridge and carry it around by itself, the cartridge is not capped, so ink can leak or dry up in the nozzles.

2.2 Transporting the Printer

Before transporting the printer, do the following:

1) Disconnect the interface cable and the Universal adapter in the same way as when carrying the printer.
2) Pack the printer and Universal adapter with the original packing materials.

If you have thrown the original packing materials away, pack the printer with plenty of shock absorbing material.

3. PRINTER SERVICING FUNCTIONS

3.1 Error Indications

The LED in combination with the beeper indicates the nature of 3 kinds of errors: fatal, error and warning.

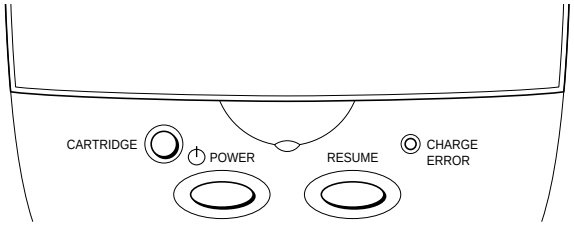


Figure 3-12 Control Panel

Fatal Error: The *ERROR* indicator and *POWER* indicator blink simultaneously. The number of beeper sounds indicates the type of the error.

Error: The *ERROR* indicator and *POWER* indicator light. The number of beeper sounds indicates the type of the error.

Warning: The *ERROR* indicator blinks and the *POWER* indicator lights. The number of beeper sounds indicates the type of the error.

TABLE 3-1 ERROR DISPLAY

Error Condition	ERROR LED	POWER LED	Beeper
[Recoverable by customers]	*(Orange)*	*(Green)*	
Paper pick-up error	Lights	Lights	1 time
Paper delivery error	Lights	Lights	2 times
BJ cartridge check	Lights	Lights	3 times
Cartridge mis-match	Lights	Lights	4times
No battery error	Lights	Lights	6times
Low battery error	Lights	Lights	Long, then short
Failed manual feeding warning	Blinks	Lights	1 times
Ink low warning*	Blinks	Lights	2 times
Cartridge replacement compulsory completion error	Blinks	Lights	3 times
Low battery warning	Blinks	Lights	4 times
Waste ink warning	Blinks	Lights	5 times
Failed battery warning	Blinks	Lights	6 time
[Unrecoverable by customers]			
ROM error	Blinks	Blinks	1 time
RAM error	Blinks	Blinks	2 times
No BJ head error	Blinks	Blinks	3 times
HP sensor error	Blinks	Blinks	4 times
Waste ink full error	Blinks	Blinks	5 times
Internal temperature error	Blinks	Blinks	6 times
Print position detection error	Blinks	Blinks	7 times
Abnormal temperature rise	Blinks	Blinks	8 times
EEPROM error	Blinks	Blinks	11 times
Failed recharge circuit error	Blinks	Blinks	12 times

* Ink low warning is enabled only when the ink low warning selection is set to on.

For details on the countermeasures when the above errors occur, refer to *Part 5: 5. TROUBLESHOOTING (page 5-5)*.

Recoverable errors by customer:

1) Paper pick-up error:
Occurs when the paper cannot be fed properly.

2) Paper delivery error:
Occurs when the printed paper cannot be ejected.

3) BJ Cartridge check:
Occurs when a BJ cartridge is not installed and the cartridge replacement mode is terminated by the printer. This error is recovered once it enters the cartridge replacement mode by holding down the *CARTRIDGE* button.

4) Cartridge mis-match error:
Occurs when the data in the host computer does not match with that of the installed cartridge. This error is recovered by holding down the *CARTRIDGE* button and installing the correct cartridge.

5) No battery error:
Occurs when the lithium ion battery is not installed in the printer. This error is recovered by unplugging and re-plugging the DC jack of the Universal adapter once the lithium ion battery is installed.

6) Failed battery warning:
Occurs when the printer detects a battery voltage lower than 7V. The printer begins to recharge the battery to bring up the voltage above 7V, however, if the voltage does not rise above 7V after 90 minutes, recharging is stopped. (At this point, the printer may still be operated with an Universal adapter.) Also occurs when the reserve recharging current is lower than a certain set value while the battery is recharging. Recharging is stopped. (There is a problem with either the recharging circuit or the battery itself.) This warning is recovered by removing the faulty battery and replacing it with a new one.

Unrecoverable errors by the customer:

7) ROM error:
Occurs when the ROM check during the initializing operation fails.

8) RAM error:
Occurs when the RAM check during the initializing operation fails.

9) EEPROM error:
Occurs when the EEPROM checking function fails during every process.
(eg. initialization, printing, etc...)

10) Home Position error:
Occurs when the home position cannot be detected.

11) Waste ink full error:
Occurs when the "total waste ink amount" recorded on the EEPROM exceeds the prescribed limit.

12) Internal temperature error:
Occurs when the temperature sensor (TH1) on the control board is defective.

13) Abnormal temperature rise error:
Occurs when the diode sensor on a BJ cartridge head detects the internal temperature to be above a predetermined value.

14) No BJ head error:
Occurs when the printer cannot detect the BJ cartridge other than during the cartridge replacement operation.

15) Print position detection error:
Occurs during when the home position cannot be detected during the print position detection process.

16) Failed recharge circuit error:
Occurs when the printer is turned on and detects the battery's recharging current higher than set value at the time. A recharging current higher than the set value means that the electrical circuit for recharging is faulty and hence recharging is stopped.

3.2 Function Setting

Each printer function settings are set from the host computer using the printer setup utility in an exclusive Windows compatible driver.

3.2.1 Default setting

The default setting can be set by button operation when the power is turned on. When the printer is turned on, hold down the *POWER* button until the beeper sounds the specified number of times. To select one of the default settings, release the *POWER* button.

Release the *POWER* button after seven beeper sounds to display Table 1 with a list of the default setting modes.

TABLE 3-2 FUNCTION SETTING (1)

Mode	Beeper	Remark
Table 1	7 times	Factory default setting (for USA LV model)
Table 2	8 times	
Table 3	9 times	Factory default setting (for HV model)
Table 4	10 times	
Table 5	11 times	

TABLE 3-3 FUNCTION SETTING (2)

	Table 1	Table 2	Table 3	Table 4	Table 5
Operation Mode change	LQ	BJ	LQ	BJ	BJ
Print Mode	HQ	HQ	HQ	HQ	HQ
Reduction Mode	1/1	1/1	1/1	1/1	1/1
Font	Roman	Courier	Roman	Courier	Courier
A4/Letter	LTR	LTR	A4	A4	A4
Page Length	23 in.	11 in.	23 in.	12 in.	12 in.
Taxt scale	OFF	OFF	OFF	OFF	OFF
Smoothing	OFF	OFF	OFF	OFF	OFF
Paper FeedPosition	8.5 mm	3.0 mm	8.5 mm	3.0 mm	3.0 mm
Automatic Line Feed	CR	CR	CR	CR	CR
Automatic Power Off	ON (30 min)	ON (30 min)	ON (30 min)	ON (30 min)	ON (30 min)
Font Lock	OFF	OFF	OFF	OFF	OFF
Input/Download Buffer	OFF	ON	OFF	OFF	OFF
Automatic Carriage Return		LF		LF	LF
Alternate Graphic Mode		OFF		OFF	OFF
International Character Set	USA		USA		
Character Set	Italic	SET 1	Italic	SET 1	SET1
Code Page	437	437	437	850	437
Ink Low Warning	OFF	OFF	OFF	OFF	OFF
Auto Emulation Change	OFF	OFF	OFF	OFF	OFF

3.3 Control Buttons

3.3.1 Cleaning the BJ cartridge

If the printed image is blurred or a print defect occurs, such as a white steaking, print a test pattern to see whether the BJ cartridge is clogged with ink. If nozzles are clogged with ink, use the *RESUME* button to clean the BJ cartridge and nozzles. Please follow these instructions:

1) When the printer is turned on with the *POWER* button hold down the *RESUME* button until the beeper sounds twice.
2) Cleaning starts and the *POWER* indicator blinks.
3) When cleaning is finished, the *POWER* indicator lights. Cleaning takes approx. 27 seconds.

After cleaning, test print the nozzle check pattern to check if the clogged nozzles have recovered. To print the nozzle check pattern, hold down the *POWER* button until the beeper sounds four times. After releasing the *POWER* button, manually feed a sheet of paper at the sound of a beep. Press the *RESUME* button to print.

When the printer's power is on, hold down the *RESUME* button until 3 beepers sounds. Release *RESUME* button to start head refreshing.

The printer carries out cleaning automatically in the following cases:

1) When the printer is turned on with the *POWER* button.
2) After replacing the BJ cartridge.
3) After replacing the ink cartridge.

3.4 Self Test Print

The printer has the "off-line" self test function which can be executed without connection to a computer.
This section explains how to execute the off-line self test.
While the printer is off line, hold down the *POWER* button until the beeper sounds the specified number of times listed below, then press the *RESUME* button to start the off-line test print through the manual feeder. The test print number corresponds to the number of beeper sounds.

Test print mode	Beeper
Demonstration pattern print	1 time
Functions settings list print	2 times
Ripple pattern print	3 times
Nozzle check print	4 times
All fonts print	6 times

Do not use any paper whose width is less than the A4-size paper width when executing a print test. Test print data is designed to be printed on A4-sized sheets, so if any paper whose width is less than the A4-sized paper width is used, the platen in the printer base unit may be stained with ink.

To stop the test pattern printing, press the *POWER* button. When the *POWER* button is pressed, the printed paper is discharged, the printer turns off.

3.4.1 Demonstration print

BJC-50
Color Bubble Jet Printer

Canon

·Exceptional portability: Compact and super lightweight design; built-in lithium ion battery; standard universal adapter and printer cable for added convenience on the move across the world.

·Built-in IrDA: Canon's infrared interface gives hassle-free wireless printing.

·High quality printing: Canon's Drop Modulation Technology™ offers professional quality output with smaller dots for smoother color gradations, a wider color range, and less visible dots.

·Professional performance: Quick, crisp black printing and brilliant, quick color printing.

·Scanner cartridge (option): By simply swapping cartridges the BJC-50 becomes a 360 dpi color sheetfed scanner.

·Superb paper handling: The optional auto sheet feeder feeds plain, photo, and coated papers, as well as envelopes, transparencies, and other Canon media.

·Excellent software compatibility: Fully compatible with Microsoft® Windows® 95, Windows® 3.1, and DOS.

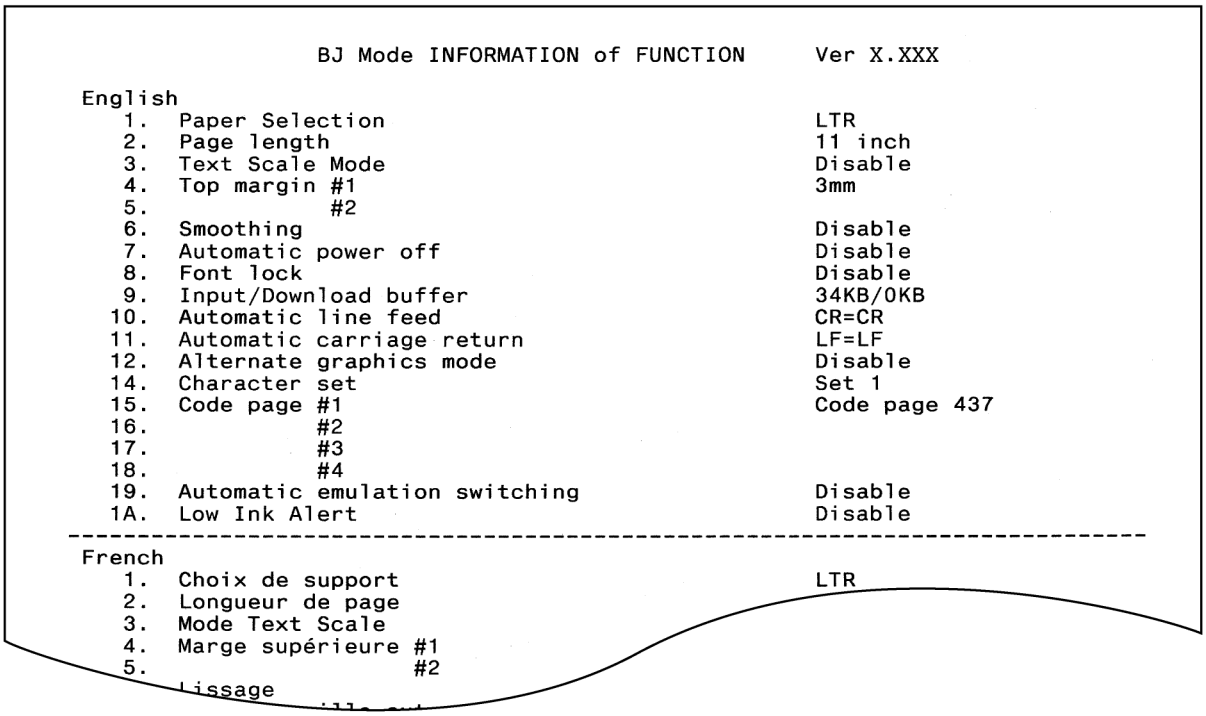
·Image Optimizer: Sophisticated driver technology optimizes low-resolution images from scanners, digital cameras, and the internet to produce smooth output without jagged edges.

·Guaranteed worldwide: Canon's International Warranty System provides worldwide repair service.

*Canon is a registered trademark and BJC is a trademark of Canon Inc.
*Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and / or in other countries.
*All other brand and product names are registered trademarks of trademarks of their respective owners.

Figure 3-13 Demonstration Print (Sample)

3.4.2 Function settings list print



```
                BJ Mode INFORMATION of FUNCTION     Ver X.XXX

English
   1.  Paper Selection                              LTR
   2.  Page length                                  11 inch
   3.  Text Scale Mode                              Disable
   4.  Top margin #1                                3mm
   5.              #2
   6.  Smoothing                                    Disable
   7.  Automatic power off                          Disable
   8.  Font lock                                    Disable
   9.  Input/Download buffer                        34KB/0KB
  10.  Automatic line feed                          CR=CR
  11.  Automatic carriage return                    LF=LF
  12.  Alternate graphics mode                      Disable
  14.  Character set                                Set 1
  15.  Code page #1                                 Code page 437
  16.             #2
  17.             #3
  18.             #4
  19.  Automatic emulation switching                Disable
  1A.  Low Ink Alert                                Disable
--------------------------------------------------------------------------------
French
   1.  Choix de support                             LTR
   2.  Longueur de page
   3.  Mode Text Scale
   4.  Marge supérieure #1
   5.                   #2
       Lissage
```

Figure 3-14 Function Settings List Print (Sample)

3.4.3 Ripple pattern print

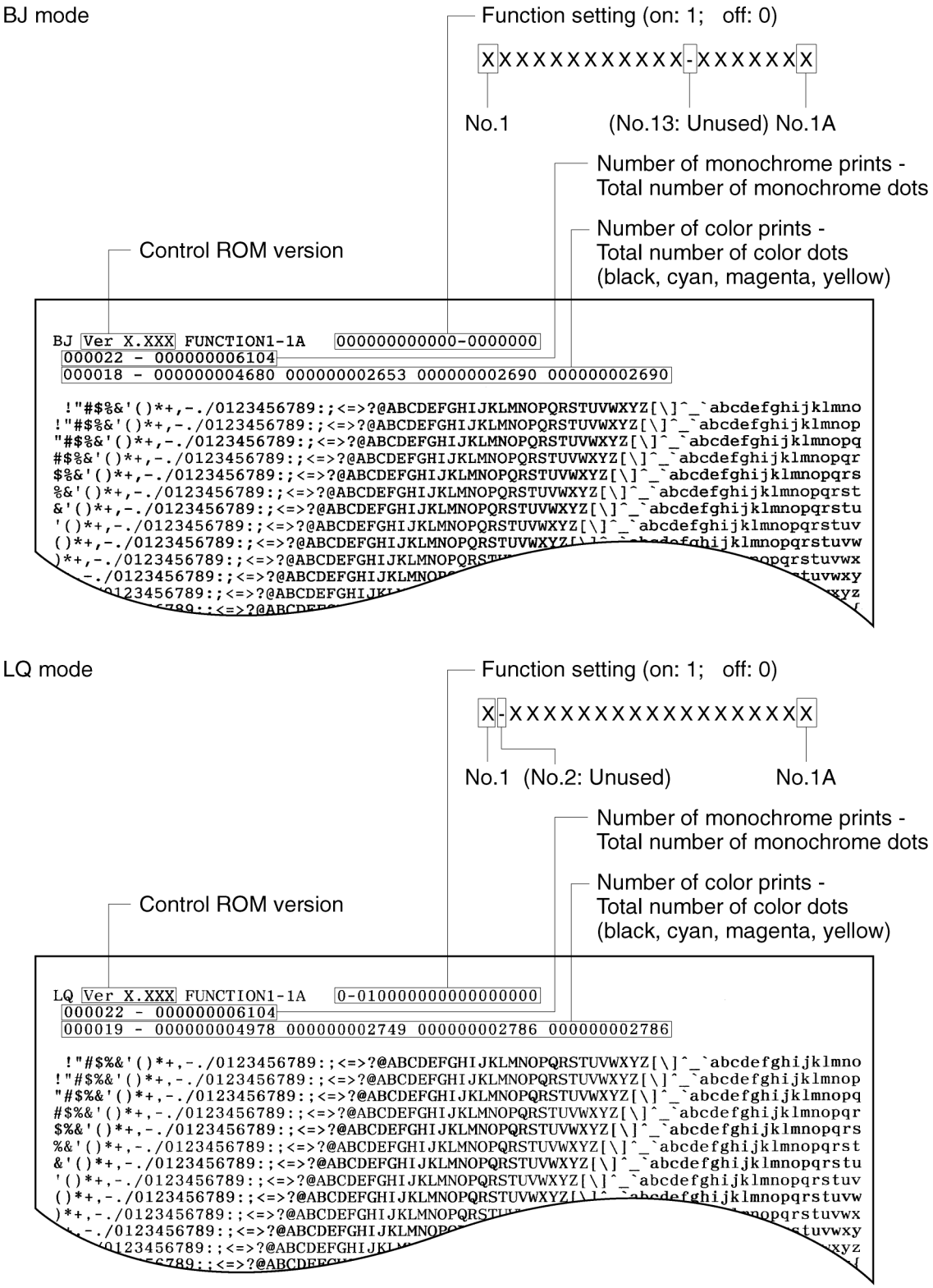


Figure 3-15 Ripple Pattern Print (Sample)

3.4.4 Nozzle check pattern print

Print out this pattern using all nozzles of the BJ cartridge. In the event that print defects appear, perform a cleaning operation of the head. If print quality does not improve even after the cartridge is cleaned once or twice times, replace the BJ cartridge. Refer to *Part 3: 3.3.1 Cleaning the BJ cartridge (page 3-16)*.

BC-11e

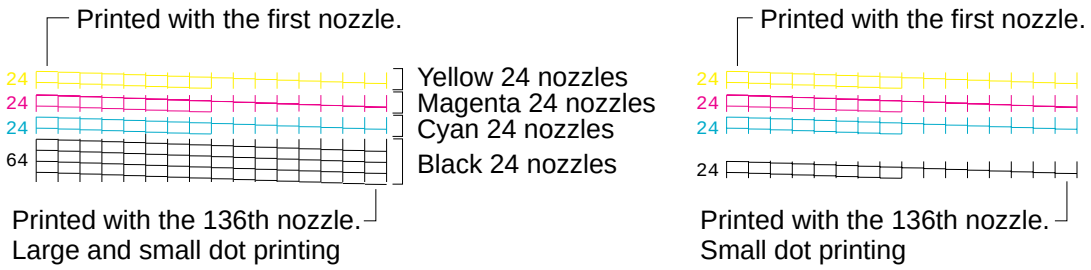


Figure 3-16 Nozzle Check Pattern Print (Sample)

3.4.5 All fonts pattern print

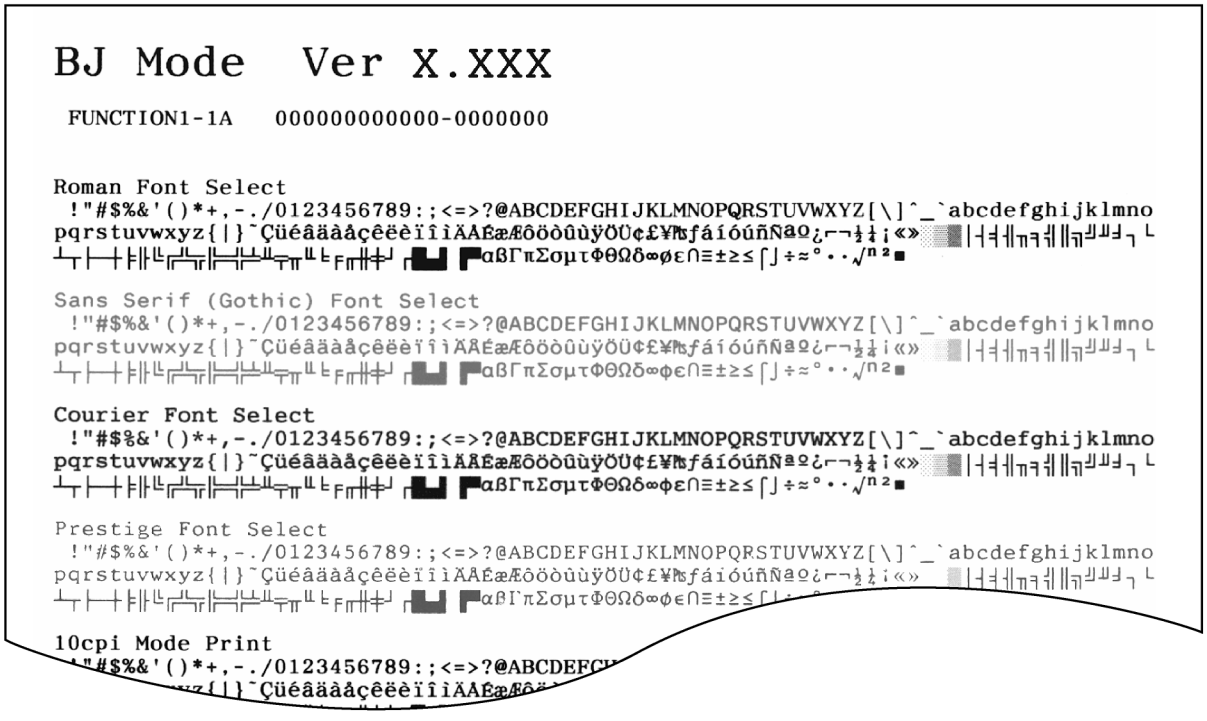


Figure 3-17 All Fonts Pattern Print (Sample)

NOTE To stop the test print, press the *POWER* button.

3.5 Hexadecimal Dump Test Print

The printer has the "on-line" self test function that outputs hexadecimal dump data when it is connected to a computer.

The hexadecimal dump test is carried out when the printer is on line to print the data coming from the computer in hexadecimal code (hexadecimal data). Hold down the *POWER* button until the beeper sounds 5 times, release the button and set a sheet of paper in the manual paper feeder to start printing the on-line self test.

Printing starts after the print buffer is full since this mode does not recognize the control code data as a control code.

Test print mode	Selected number
Hexadecimal dump test print	5

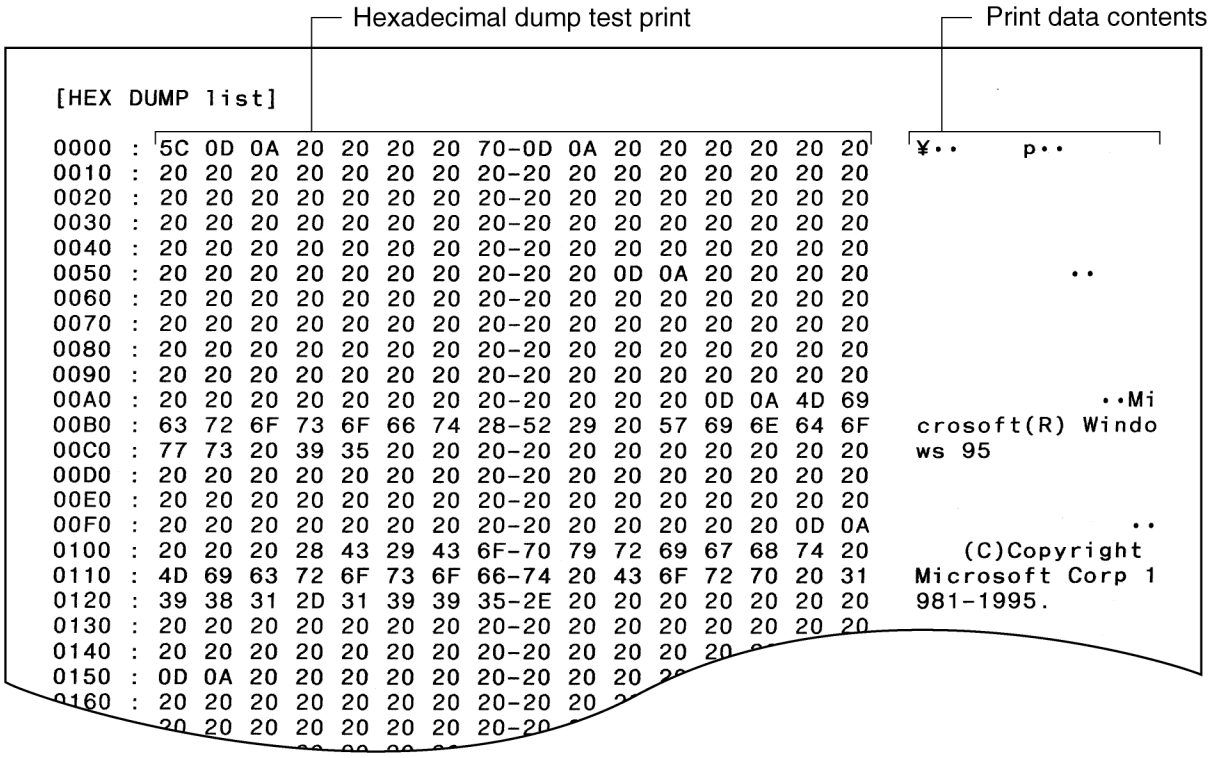


Figure 3-18 Hexadecimal Dump Test Print (Sample)

3.6 EEPROM Data Setting

3.6.1 EEPROM data setting mode

The required EEPROM data is set in this mode when replacing the control PCB assembly or the printer base unit (including the waste ink absorber).
The EEPROM (IC14) on the control PCB assembly contains machine specific data, such as waste ink amount and the remaining quantity of ink in the ink cartridge. Data must be set in the EEPROM when replacing the control PCB assembly or the printer base unit (including the waste ink absorber).

a) When replacing the control PCB assembly

Before installing a new control PCB assembly, visually check the waste ink amount for the waste ink absorber in the printer base unit. After replacing the control PCB assembly, set the waste ink amount in the EEPROM.

b) When replacing the printer base unit (including the waste ink absorber)

Set 0% (EEPROM clear) after replacing the printer base unit.

3.6.2 Setting EEPROM data

1. Remove the lithium ion battery.
2. While holding down the *RESUME* button, insert the DC plug of the Universal adapter into the printer.
3. While holding down the *RESUME* button and the *CARTRIDGE* button, press the *POWER* button. Release all the buttons when one long and short beeper sounds. Press the *CARTRIDGE* button to select the following number of beeper sounds. Set the waste ink amount of the waste ink absorber in the printer base unit (Roughly estimate the amount of ink absorbed on the surface of the waste ink absorber).

Beeper	Waste ink amount (Use the *CARTRIDGE* button to change)
7 times	0% used (new ink absorbed/EEPROM clear)
16 times	25% used
15 times	50% used
14 times	75% used

If 25%, 50% or 75% is selected:

Press the *RESUME* button to set data in the EEPROM.
After setting is completed, press the *POWER* button to turn off the printer.

If 0%(EEPROM clear)is selected:

Press the *RESUME* button. Initialization starts and a beeper sounds.
To clear the data in the EEPROM, press the *POWER* button to turn off the printer and remove the DC plug of the Universal adapter from the printer's power connector after completing initialization.
Clear the data in the EEPROM.

3.6.3 Displaying EEPROM data

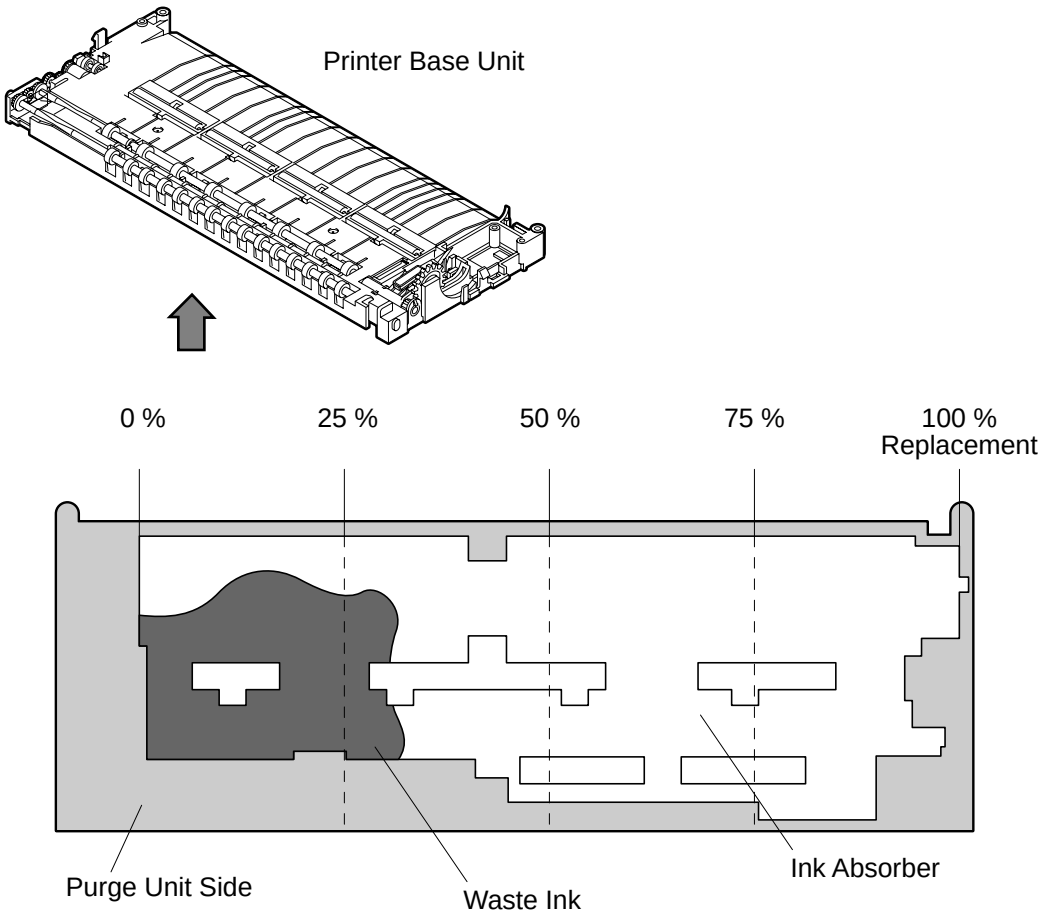
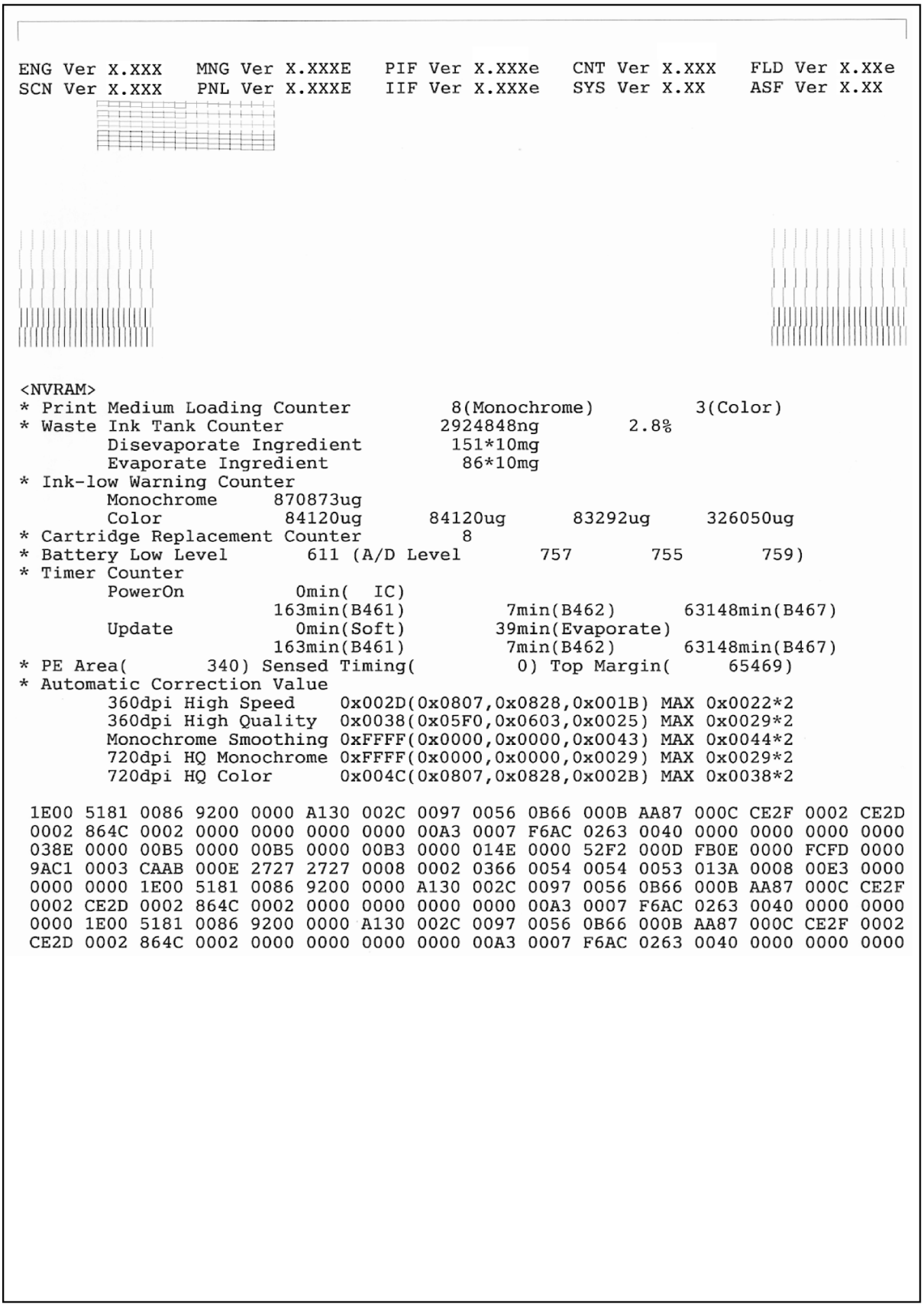


Figure 3-19 Waste Ink Absorber (50% Used Sample)

The EEPROM contains the total waste ink amount and the total number of pages fed, which are counted while the printer is used. This data is useful to know the frequency of use of the printer.

1. Remove the lithium ion battery.
2. While holding down *RESUME* button, insert the DC plug of the Universal adapter into the Universal adapter connector of the printer.
3. While holding down the *RESUME* button and the *CARTRIDGE* button, press the *POWER* button until one long and short beeper sounds.
   Every time the *CARTRIDGE* button is pressed, a beeper sounds. When the *RESUME* button is pressed after the beeper sounds 13 times (i.e. pressing the cartridge button 13 times), release the button and set a sheet of paper in the manual paper feeder to start printing the EEPROM setting list.

3.6.4 EEPROM settings list print



```
ENG Ver X.XXX   MNG Ver X.XXXE   PIF Ver X.XXXe   CNT Ver X.XXX   FLD Ver X.XXe
SCN Ver X.XXX   PNL Ver X.XXXE   IIF Ver X.XXXe   SYS Ver X.XX    ASF Ver X.XX

<NVRAM>
* Print Medium Loading Counter          8(Monochrome)          3(Color)
* Waste Ink Tank Counter               2924848ng        2.8%
        Disevaporate Ingredient         151*10mg
        Evaporate Ingredient             86*10mg
* Ink-low Warning Counter
        Monochrome     870873ug
        Color           84120ug      84120ug      83292ug     326050ug
* Cartridge Replacement Counter          8
* Battery Low Level       611 (A/D Level       757       755       759)
* Timer Counter
        PowerOn           0min(  IC)
                        163min(B461)         7min(B462)      63148min(B467)
        Update            0min(Soft)        39min(Evaporate)
                        163min(B461)         7min(B462)      63148min(B467)
* PE Area(       340) Sensed Timing(          0) Top Margin(     65469)
* Automatic Correction Value
        360dpi High Speed     0x002D(0x0807,0x0828,0x001B) MAX 0x0022*2
        360dpi High Quality   0x0038(0x05F0,0x0603,0x0025) MAX 0x0029*2
        Monochrome Smoothing  0xFFFF(0x0000,0x0000,0x0043) MAX 0x0044*2
        720dpi HQ Monochrome  0xFFFF(0x0000,0x0000,0x0029) MAX 0x0029*2
        720dpi HQ Color       0x004C(0x0807,0x0828,0x002B) MAX 0x0038*2

 1E00 5181 0086 9200 0000 A130 002C 0097 0056 0B66 000B AA87 000C CE2F 0002 CE2D
 0002 864C 0002 0000 0000 0000 0000 00A3 0007 F6AC 0263 0040 0000 0000 0000 0000
 038E 0000 00B5 0000 00B5 0000 00B3 0000 014E 0000 52F2 000D FB0E 0000 FCFD 0000
 9AC1 0003 CAAB 000E 2727 2727 0008 0002 0366 0054 0054 0053 013A 0008 00E3 0000
 0000 0000 1E00 5181 0086 9200 0000 A130 002C 0097 0056 0B66 000B AA87 000C CE2F
 0002 CE2D 0002 864C 0002 0000 0000 0000 0000 00A3 0007 F6AC 0263 0040 0000 0000
 0000 1E00 5181 0086 9200 0000 A130 002C 0097 0056 0B66 000B AA87 000C CE2F 0002
 CE2D 0002 864C 0002 0000 0000 0000 0000 00A3 0007 F6AC 0263 0040 0000 0000 0000
```

Figure 3-20 EEPROM Settings List Print (Sample)

3.7 Rewriting Flash ROM

3.7.1 Flash ROM rewrite mode

This mode can only be accessed by a service person. The flash ROM program can be rewritten using this mode. When upgrading the ROM, a floppy disk containing the upgraded program will be provided. Follow these instructions in order to reset the settings in both the host computer and printer.

The lithium ion battery should not be used in flash ROM rewrite mode. Please remove the lithium battery from the printer.

a) Resetting the Printer

1) Remove the lithium ion battery.
2) While holding down the *RESUME* button and *CARTRIDGE* button, insert the DC plug of the Universal adapter in the printer until one long and short beeper sounds, then release the buttons.
3) Press the *RESUME* button until a short beeper sounds, then release the button. After completion of the initialization process, a short beeper will sound and the *POWER* indicator will light.

The printer is now in the flash ROM rewrite mode and ready to receive the rewrite program.

b) Resetting the Host Computer

1) Start up the computer and go to the MS-DOS prompt.
2) Connect the interface cable in the printer's LPT1 port.

The operating system of the host computer should be MS-DOS. The average rewrite time is about 40 seconds, however depending on the host computer's performance and OS transfer speed, it may take more than 40 seconds.
Reference
[Computer: Pentium 133MHz, Microsoft Windows 95 (4.00.950a)]

c) Downloading the rewrite program

1) Transfer data from the computer to the printer using the MS-DOS COPY command.

eg) COPY 230J0150.DL LPT1
└── File name in the FD directory

2) The *POWER* indicator blinks while the flash ROM is being rewritten.
3) Flash ROM rewrite is completed when two short beepers sound and the *POWER* indicator lights.
4) After checking that rewrite is completed, remove the DC plug from the printer. Make sure to unplug the DC plug before turning on the printer with the *POWER* button.

If you get a rewrite error, reset the following:

Error message	POWER indicator	ERROR indicator	Beepers
DATA error	Lights	Blinks	2 long beepers
FLASH error	Blinks	Blinks (alternates with *POWER* indicator)	2 long beepers
RAM error	Blinks	Blinks (simultaneous with *POWER* indicator)	2 long beepers

Follow these procedures when an error occurs:

DATA error:
Occurs after each rewrite data has been transfered. Hence, data prior to the error is already rewritten.
Make sure that the floppy disk corresponds to the printer model. For example, do not rewrite data for BJC-50 with BJC-50v's. To transfer the correct data, check the connection with the computer and re-enter the rewrite mode and repeat the steps.

FLASH error:
Occurs after each rewrite data has been transferred. Hence, data prior to the error is already rewritten.
Re-enter the rewrite mode and transfer the connect data. If the same error recurs, the flash ROM might be damaged. In that case, exchange the control board.

RAM error:
Occurs when the printer goes to check for available RAM to operate rewrite. No rewrite has taken place at this point. In this case, exchange the control board.

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Part 4

TECHNICAL REFERENCE

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4 - 4	1.3	Print Signal Flow
4 - 5	1.4	Print Drive
4 - 7	1.5	Scanner Drive
4 - 8	1.6	Power Off Operation Flow
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4 -15	2.2	720 dpi Printing/Smoothing Feature
4 -16	2.3	Printing Modes
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4 -39	4.3	Power Supply Section
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4 -44	5.2	Paper End Sensor
4 -44	5.3	Delivery Sensor
4 -44	5.4	Temperature Sensor
4 -44	5.5	Head Temperature Sensor
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4 -45	5.7	Remaining-ink Level Detection
4 -46	6.	SCANNER CARTRIDGE
4 -46	6.1	Scanner Cartridge Overview
4 -47	6.2	Scanner Cartridge Structure
4 -49	6.3	Signal Contacts
4 -50	6.4	Scan Mode
4 -50	6.5	Calibration

1. OVERVIEW

1.1 Printer Block Diagram

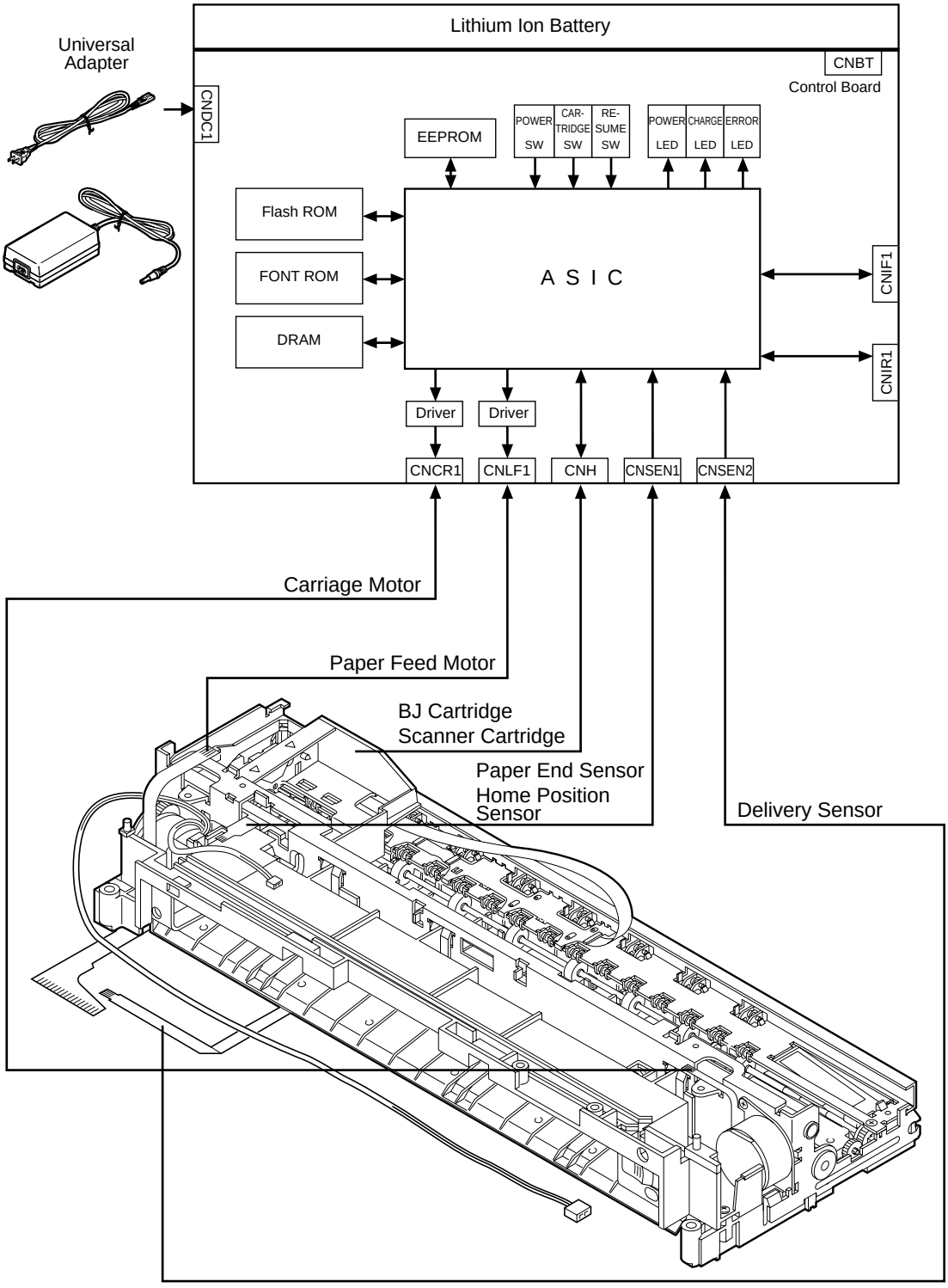
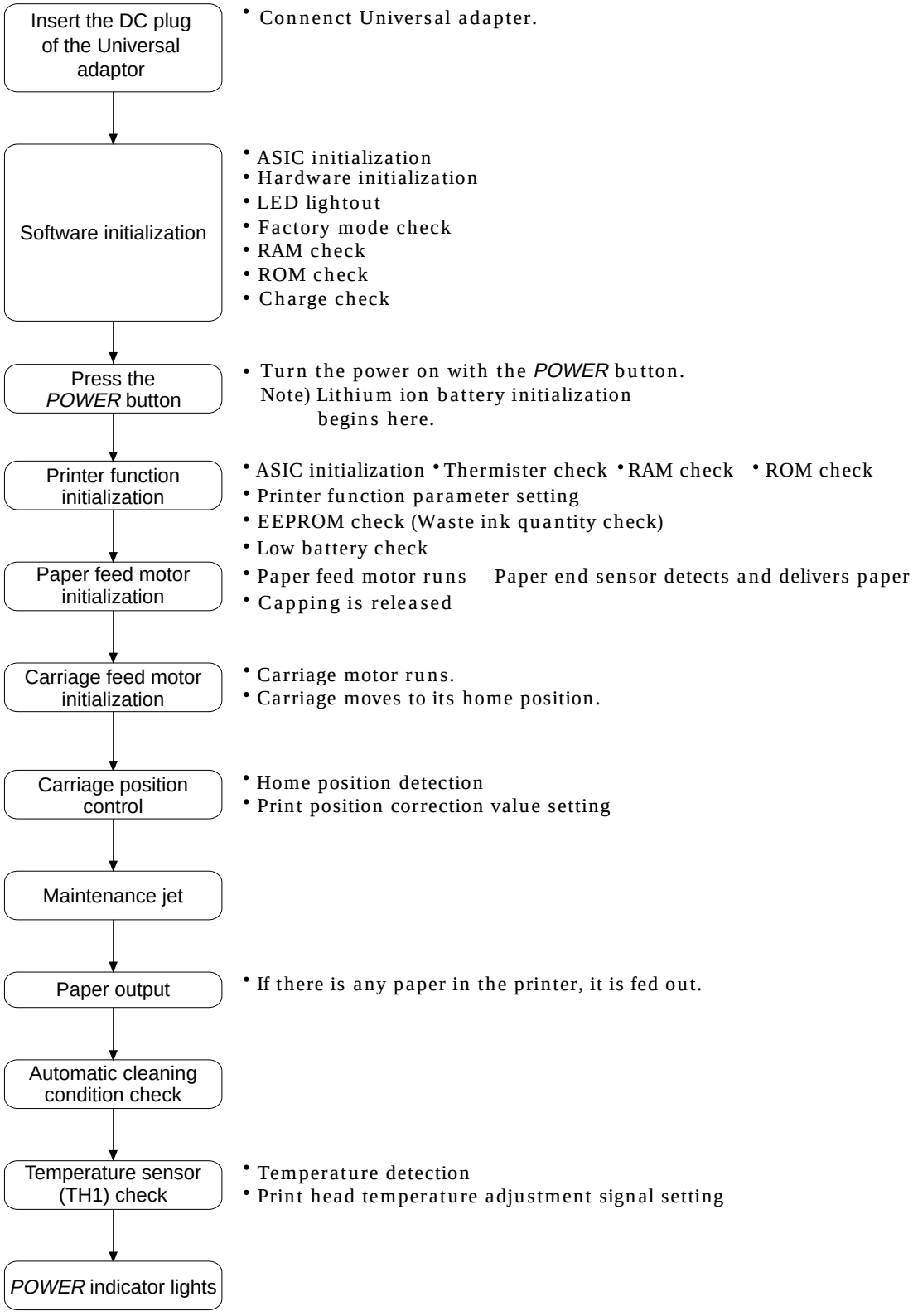


Figure 4-1 Printer Diagram

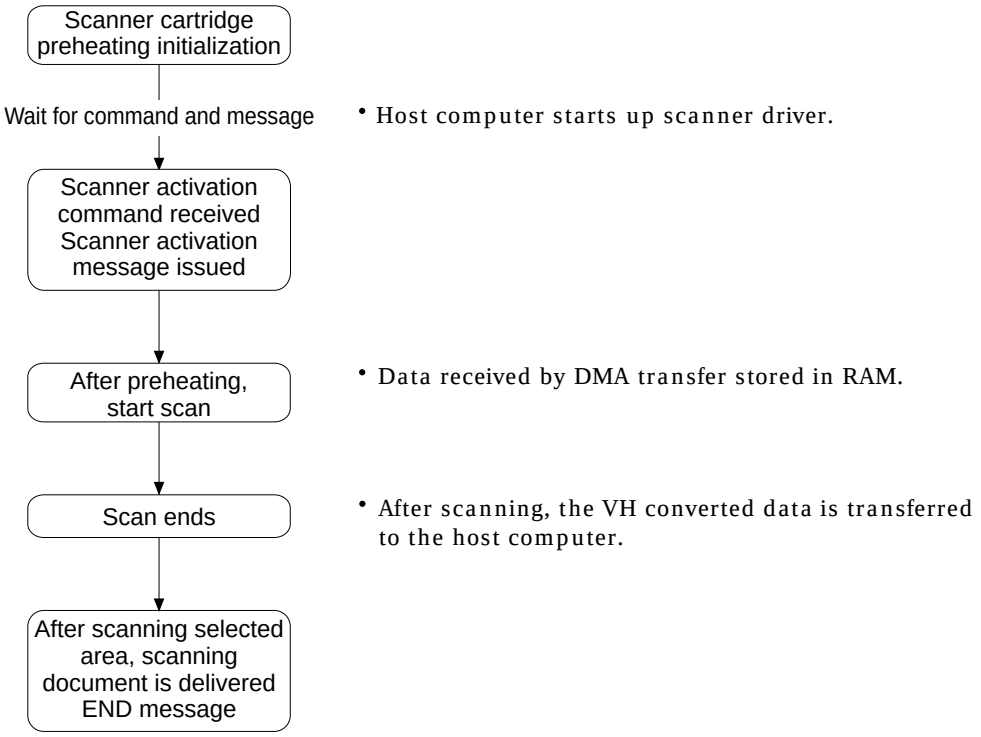
1.2 Initial Flowchart

1.2.1 Print mode


Insert the DC plug of the Universal adaptor
• Connenct Universal adapter.
Software initialization
• ASIC initialization
• Hardware initialization
• LED lightout
• Factory mode check
• RAM check
• ROM check
• Charge check
Press the POWER button
• Turn the power on with the POWER button.
Note) Lithium ion battery initialization begins here.
Printer function initialization
• ASIC initialization • Thermister check • RAM check • ROM check
• Printer function parameter setting
• EEPROM check (Waste ink quantity check)
• Low battery check
Paper feed motor initialization
• Paper feed motor runs Paper end sensor detects and delivers paper
• Capping is released
Carriage feed motor initialization
• Carriage motor runs.
• Carriage moves to its home position.
Carriage position control
• Home position detection
• Print position correction value setting
Maintenance jet
Paper output
• If there is any paper in the printer, it is fed out.
Automatic cleaning condition check
Temperature sensor (TH1) check
• Temperature detection
• Print head temperature adjustment signal setting
POWER indicator lights

1.2.2 Scanner mode

When powered on, the printer starts up in the printer mode regardless of the printer head type.
Once the printer is on, it stands by to receive a data or a command.
When the printer recognizes the scanner activation command, the printer starts operating in the scanner mode. After the printer recognizes the scanner head and performs the POWER ON operation, the printer starts to preheat the scanner head.


Scanner cartridge preheating initialization
Wait for command and message
• Host computer starts up scanner driver.
Scanner activation command received Scanner activation message issued
After preheating, start scan
• Data received by DMA transfer stored in RAM.
Scan ends
• After scanning, the VH converted data is transferred to the host computer.
After scanning selected area, scanning document is delivered END message

1.3 Print Signal Flow

The print signal flow from when the printer receives the print data to when printing is executed is described below.

a) The print data (including the control signals) output by the computer is received by the ASIC through the interface, which is controlled by the ASIC on the logic board. Through the dedicated bus between the printer controller and DRAM, print data is stored in the DRAM's receive buffer area.

b) The print data in the receive buffer is sent to the ASIC and separated into control commands and print data based on the data stored in the control ROM*. The control commands are processed in the ASIC.

c) The print data is stored in the DRAM's print buffer.

d) When the ASIC receives the command from the DRAM to start printing, it receives print data stored in the DRAM's print buffer. At the same time, the ASIC receives control commands stored in the control ROM*.

e) The ASIC converts the print data into serial data as print drive signals and outputs the serial data to the bubble jet head. In the bubble jet head, the print data is converted from serial signals to parallel print data for each printed line. Printing is executed while the ASIC is controlled by the print control signals.

* Control ROM: Flash ROM

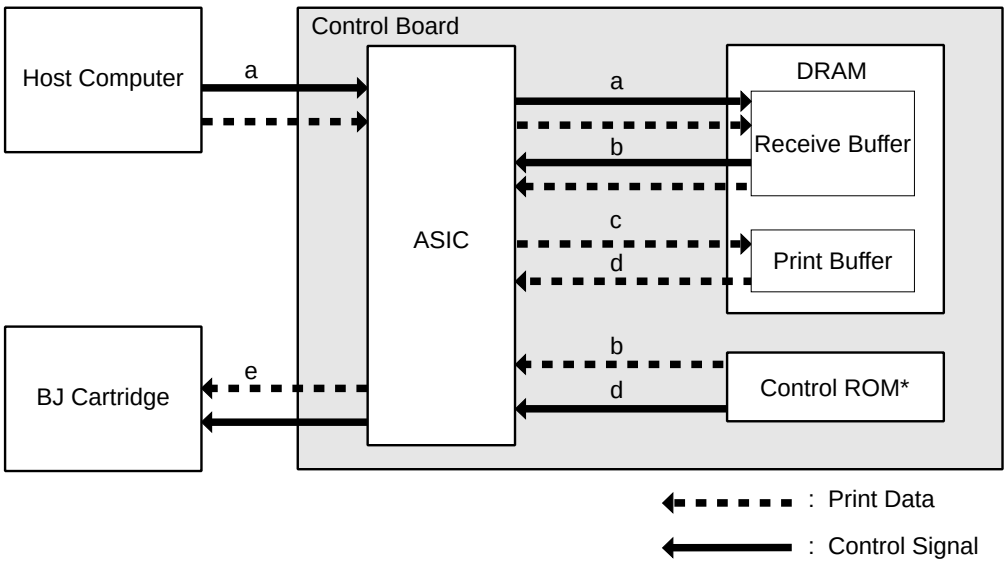


Figure 4-2 Printing Signal Flow

1.4 Print Drive

The printer outputs control signals from the ASIC's printer controller to the BJ head to eject ink from the BJ head for printing.
The control signals consist of the print control signal for ejecting ink from the head's nozzles and the temperature control signal for adjusting the head's temperature so that the amount of ink ejected is uniform.
To archive optimum printing, both these control signals are optimized by the printer controller and sent from the carriage ribbon cable's signal contacts to the BJ head.
The drive frequency varies depending on the printing mode and BJ cartridge type.

1.4.1 Printing drive control

a) Black BJ cartridge drive control

The black BJ cartridge drive control is executed by dividing the head's 128 nozzles into 8 blocks (16 nozzles each). These blocks are further divided into odd and even blocks (8 nozzles each). The odd blocks eject ink simultaneously and the even blocks do so as well. The control signals for the former are the block enable 0, 1, and 2 signals (BENB 0, 1, 2) and for the latter the signals are the even/odd enable signals (Even/Odd ENB). The heat enable A and D (HENB A, D), which are the heater drive control signals for ejecting the ink, comprise of a prepulse and main pulse. To constantly archive optimum ink ejection, the internal conditions such as the head's rank, printer temperature, and head temperature are monitored and the heater drive pulse width is varied before the pulse is output. Furthermore, the print drive signal from the printer controller is transferred to the BJ head's shift resistor according to the HLATCH timing. The printing drive signal (HDATA) is latched and when the print control and heater drive control signals are output together, the heater for the applicable nozzles is driven and the ink is ejected.

b) Color BJ cartridge (Large/Small Drop) drive control

The two-size droplet type color BJ cartridge has a print head with 136 nozzles and each nozzle has two heaters, one infront of the other, that regulate the ejection of large and small ink droplets. The 136 nozzles are divided into 8 functional blocks, each block consisting of 16 nozzles. Ink is ejected consecutively from each block. The order and selection of nozzles to be used are controlled by BLOCK ENABLE signals (BENB 0,1,2) and the EVEN/ODD ENABLE signal (Even/Odd ENB). HEAT ENABLE signals (HENB A,B,C,D) control the heater boards.

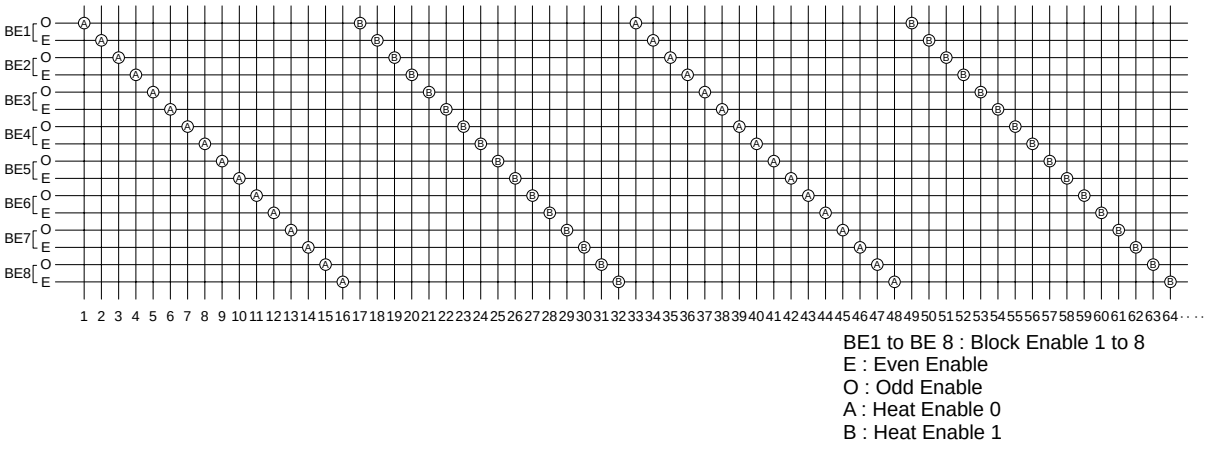
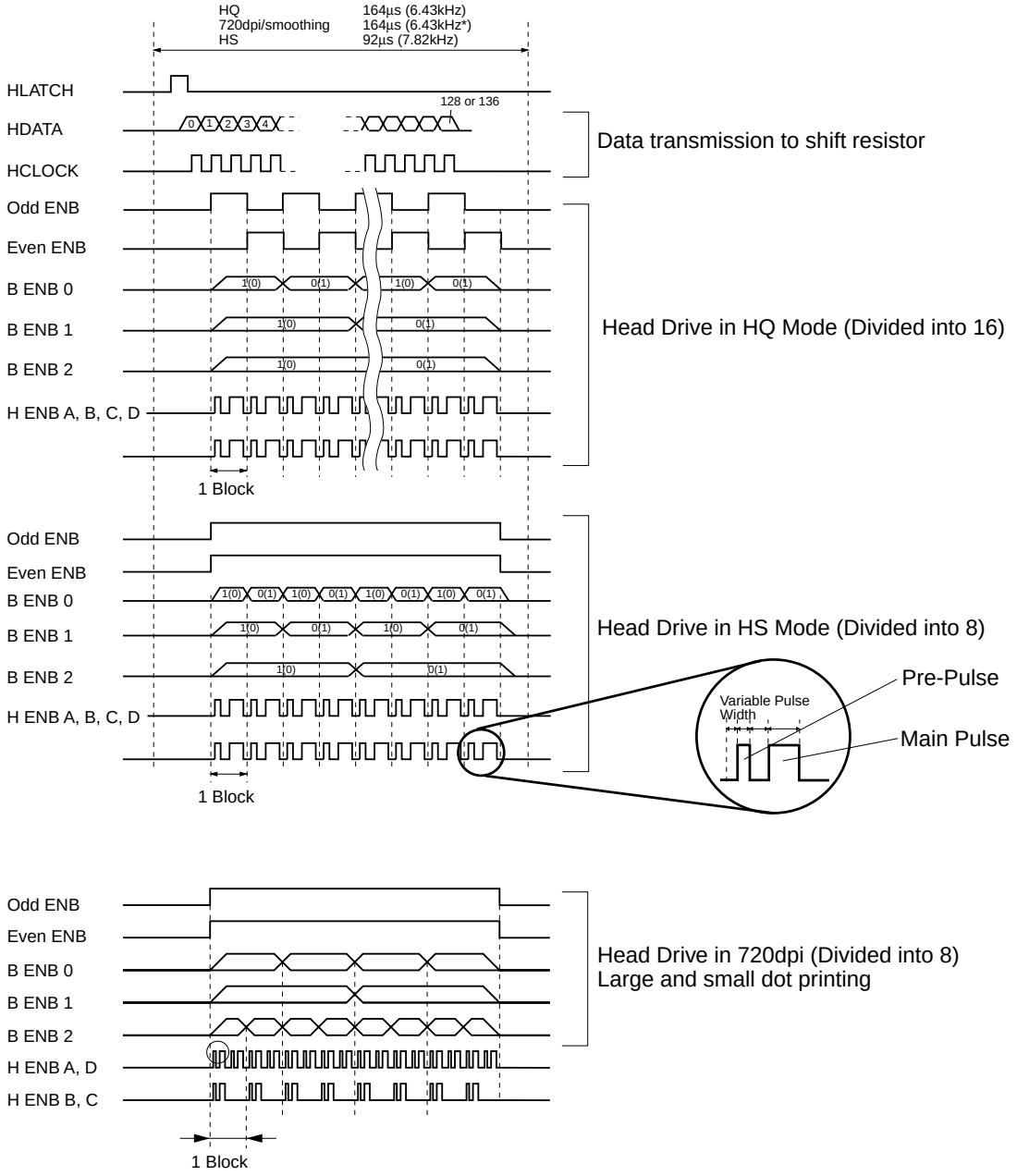


Figure 4-3 Print Sequence (Black BJ Cartridge in HQ Mode)

The HEAT ENABLE signals control the ejection of small and large ink droplets as follows:
For each color, (Y, M and C), HENB B and A signals drive the front and back nozzle heaters respectively. For black, HENB C and D signals drive the front and back nozzle heaters respectively.
The HEAT ENABLE signal consists of the pre-pulse and the main pulse that optimize ink ejection by constantly monitoring the head rank, the printer inner temperature and head temperature. The ink is ejected by varying the HEAT ENABLE pulse width.



When using a black BJ cartridge, HENEB A and D are drive signals. When using the color BJ cartridge, HENEB A and B drive yellow, magenta and cyan, and HENEB C and D drive black.

Figure 4-4 Print Signals

1.5 Scanner Drive

The scanner cartridge is recognized by the scanner cartridge contacts and TOP.S, C.CHA and C.CHK signals. These three signals are equivalent to the TOP, DIODE A and DIODE K signals of the BJ cartridge.
Color distinction is performed by ID 0 and ID 1 as in the BJ cartridge.
The three signals, CMD 0 (REN), CMD 1 (RWR) and CMD 3 (RDT) are used to set data in the scanner resistor. These signals correspond with the ODD ENB, BENB 0 and BENB 1 signals of the BJ cartridge. Together with a clock signal, serial data is output to the resistor.
Data scanned with a scanner cartridge is output by S.SCLOCK (DTCK), S.SYNC (LNST) and S.DATA (DT). The scanner cartridge is operated when the S.SYNC (LNST) signal is inputted.
The scanning dot data set in the resistor is output as serial data in sync with a clock signal.

Output clock frequencies

Scanner →	Printer
Binary:	1MHz
Multi-valued:	2MHz or 4MHz

Scanner Cartridge Contact Signals

Terminal No.	Scanner Signal		Remarks	Head Signal		ASIC Port
	Signal Name	Polarity		Signal Name	Polarity	
1	LAMP G	n/a	GND for LED	VHG	n/a	n/a
2	LAMP G	n/a	GND for LED	VHG	n/a	n/a
5	V LAMP	n/a	24 V power for LED	HVH	n/a	n/a
6	V LAMP	n/a	24 V power for LED	HVH	n/a	n/a
9	TOP.S	O	GND for scanner recognition	TOP	O	Input Port
10	DIAS		OPEN for scanner recognition	DIODE A	O	Input Port
11	ID 0	O	Color scanner cartridge detection	ID 0	O	Input Port
12	ID 1	O	Color scanner cartridge detection	ID 1	O	Input Port
13	SQW		IS-11 and IS-12 detection	INK S2		Input Port
14	VSS	n/a	GND	H VSS	n/a	n/a
19	CMD 0 (REN)	I	Resistor enable signal	ODD ENB	I	Output Port
20	CMD 1 (RWR)	I	Register recording clock signal	BNEB 0	I	Output Port
21	CMD 2 (RDT)	I	Resistor data signal	BNEB 1	I	Output Port
22	CMD 3 (N.C.)		Unused	BNEB 2	I	Output Port
23	VDD	n/a	5V power	H VDD	n/a	n/a
24	S CLOCK (DTCK)	O	Output clock	H CLOCK	I	Bidirectional Port
25	S SYNE (LNST)	I	Line start signal	H LATCH	I	Output Port
26	S RES (RST)	I	System reset signal	H RES	I	Output Port
28	S DATA (DT)	O	Output data	H DATA	I	Bidirectional Port
29	DIAS		OPEN scanner detection	DIODE K	O	Input Port

1.6 Power Off Operation Flow

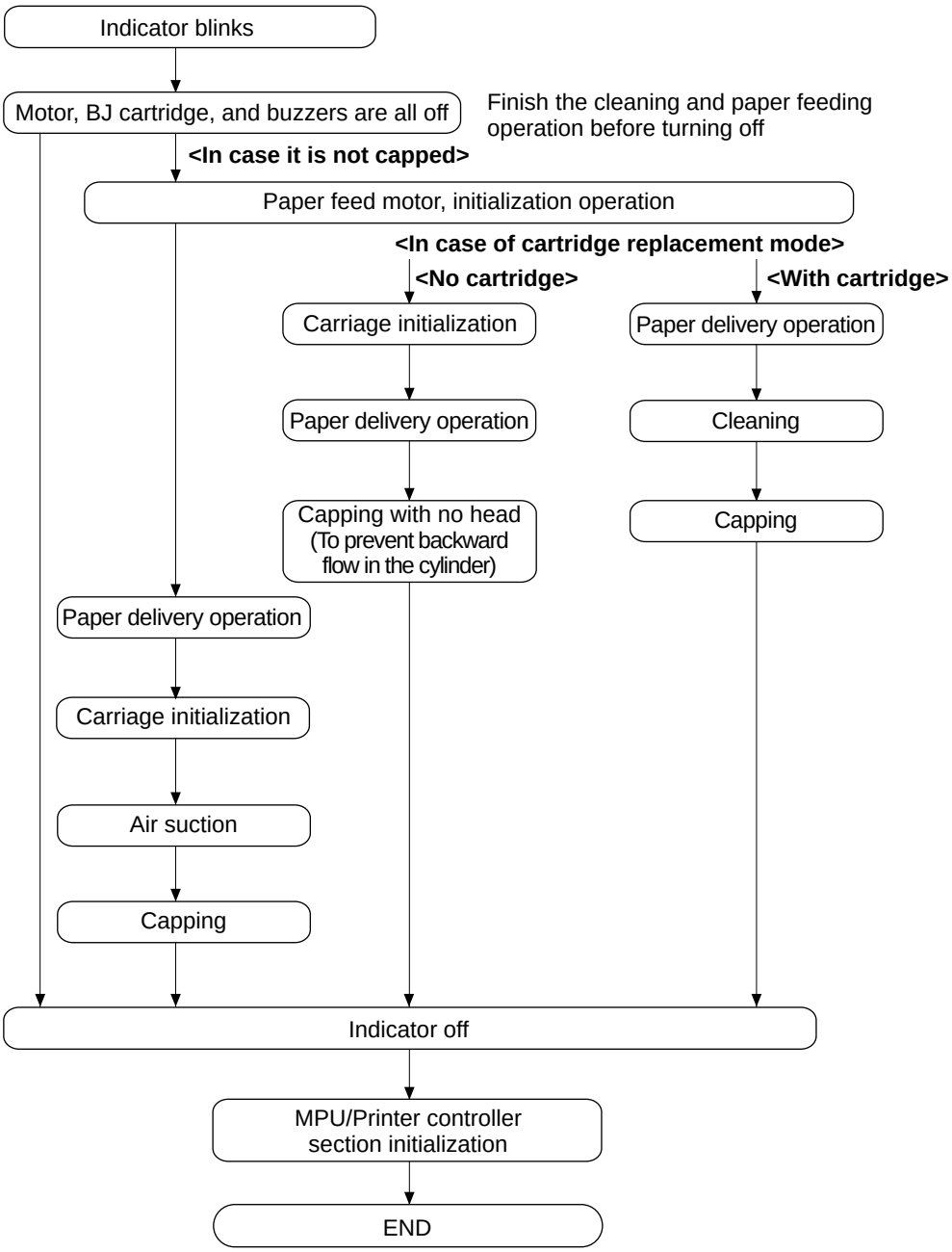


Figure 4-5 Power Off Operation Flow

CAUTION

When the printer is turned off by unplugging the DC power cord, the power off operation is interrupted and stopped. Head capping might not be completed. Turn on the printer and turn it off using the *POWER* button and then unplug the DC power cord.

2. FIRMWARE

2.1 Interface

The printer supports a parallel interface and IrDA interface. The parallel interface is compatible with the bidirectional Centronics interface-standard (IEEE 1284). Compatible mode is the same as the Centronics interface-standard protocol. IrDA is an infrared data communication interface that is compatible with IrDA (1.0). The interface data transfer timing for each of the parallel interface mode is described below.

2.1.1 Compatible mode

The parallel interface for the compatible mode transfers data in 8-bit units. Data is transferred with the $\overline{\text{STROBE}}$, BUSY, and $\overline{\text{ACKNLG}}$ handshake signals.
When the printer receives the data (Data 1-8) and a $\overline{\text{STROBE}}$ signal from the host computer and if the $\overline{\text{STROBE}}$ signal is low, then the printer controller which controls the parallel interface outputs the a BUSY signal and latches the data. After the BUSY signal is output, the printer controller sends the latched data from the DRAM bus to the receive buffer in the DRAM. After the data is completely written into the receive buffer in the DRAM, the printer controller outputs the $\overline{\text{ACKNLG}}$ signal and sets the BUSY signal to "Low". It then waits for the next data input from the host computer.

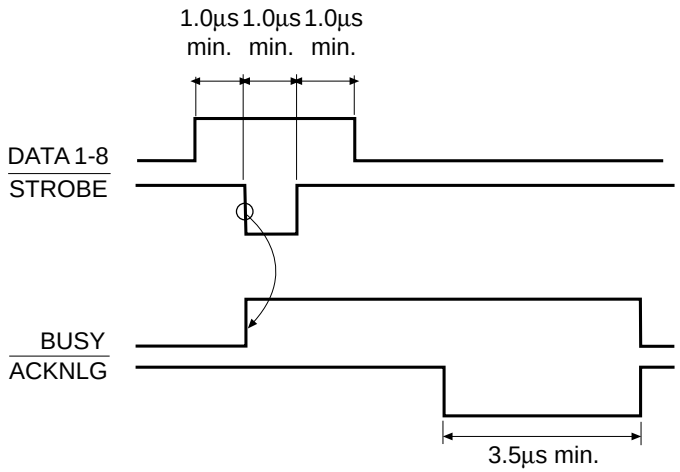


Figure 4-6 Interface Timing (Compatible Mode)

2.1.2 Nibble mode

In nibble mode, the printer transfers data twice to the host computer in 4-bit units. The data is transferred with the PtrClk signal and HostBusy signal handshakes.

After the printer negotiates with the host computer and enters the nibble mode, the printer confirms that the HostBusy signal is low, outputs a PtrClk signal with a nibble setting on the lower bits and lowers the PtrClk signal. After the host computer receives the lower bit data with the nibble mode, it raises the HostBusy signal. This signals the printer that the host computer has read the nibble data. Next, after the printer confirms that the HostBusy signal is low for a second time, it outputs the upper nibble bits and lowers the PtrClk signals.

When the host computer raises the HostBusy signal, the handshake is completed. If there is no data to be sent to the host computer, the DataAvail signal becomes high and the printer stands by for the next data transfer.

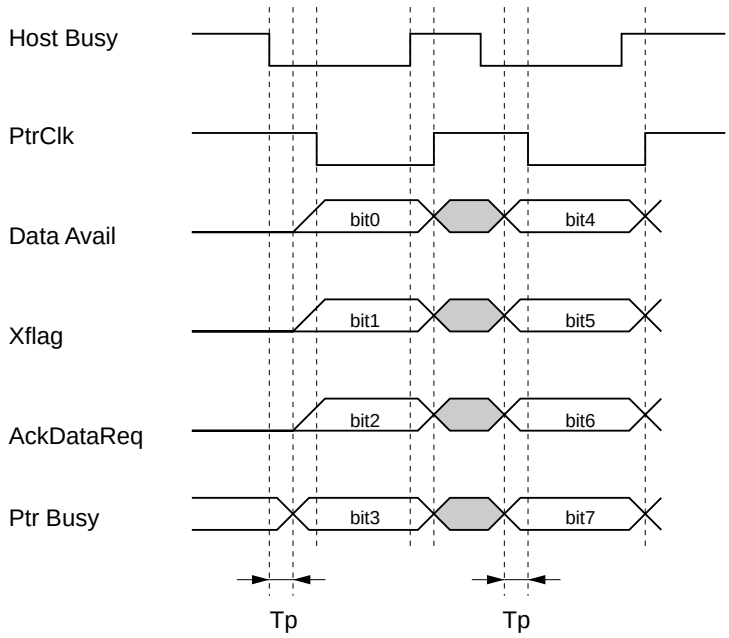


Figure 4-7 Interface Timing (Nibble Mode)

2.1.3 ECP mode

In ECP mode, the PeriphAck signal and the HostClk signal handshake to communicate.

After the host computer negotiates with the printer, the printer raises the PeriphClk signal and the host computer lowers the HostAck signals. At this point the host computer sets the data on the bus and lowers the HostClk signal to transmit the data. When the printer is ready to receive data, it raises the PeriphAck signal. The transfer from the host computer is complete once the printer receives the data and lowers the PeriphAck signal.

Next, to send data from the printer to the host computer, the host computer's ReverseRequest signal is lowered. The printer lowers the AckReverse signal, raises the PeriphRequest signal and prepares the data to be sent on the bus.

In reverse transfer, the PeriphClk signal and the HostAck signal handshake to communicate.

The printer sets the data on the data bus and lowers the PeriphClk signal to transmit data.

The host computer raises the HostAck signal to indicate it is ready to receive the host computer data.

The transfer of data from the printer is complete when the host computer lowers the HostAck signal after it receives the host computer data.

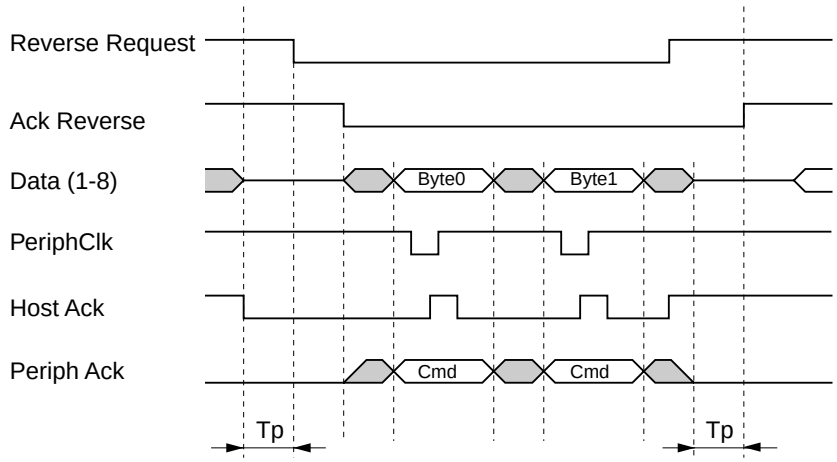


Figure 4-8 Interface Timing (ECP Mode)

2.1.4 IrDA

IrDA is an IrDA (1.0) conforming infrared serial communicating device that is built-in on the back side of the printer. Input and output of infrared light is conducted through this device. For wireless infrared one-to-one communication, the computer's IrDA and the printer's IrDA must be facing each other. The infrared light emitted from the IrDA travel sideways and lengthwise as sown in Figure 4-9. The forward direction is the light axis.

As the infrared light travel sideways and lengthwise in a two dimensional plane, the intensity of the light along the light axis decreases disproportional to the square of the distance between the IrDAs. The IrDA standard establishes the infrared emission intensity and the receptor sensitivity to ensure quality transmission. The IrDA transmission end should be located within the shown circular cone. [distance: 1 m, angle: 15Þ from the light axis]

The infrared transmitter and the receiver are integrated into one unit.

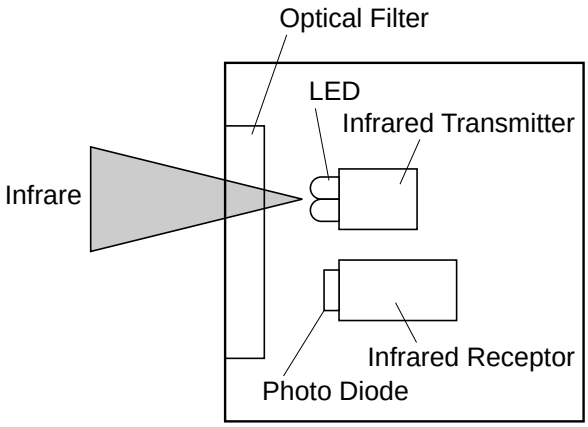


Figure 4-9 IrDA

a) Transmission formats

There are two transmission formats, the base band transmission and the variation transmission.

In base band transmission, the RZ signals that represent bit data control the ON/OFF of the infrared light. When the data is "0" in the IrDA mode, infrared rays are emitted only for a duration of 3/16 of the time required to send 1 bit of data.

In variation transmission, the amplitude of the infrared carrier frequency is varied depending on the digital data. (ASK format)

Infrared light with a peak wavelength between 850 nm and 900 nm is switched on and off at 500kHz to be used as a carrier frequency.

NOTE The ASK format is used by Sharp's Zaurus.

• **Base band transmission format (IrDA)**

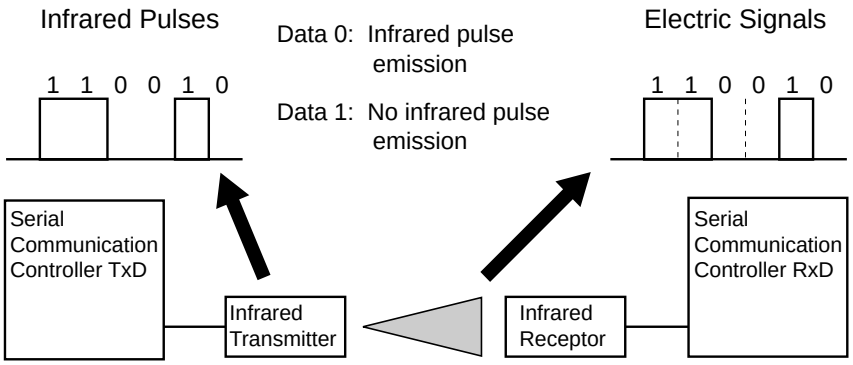


Figure 4-10 Base Band Transmission Format (IrDA)

• **Carrier transmission format (ASK)**

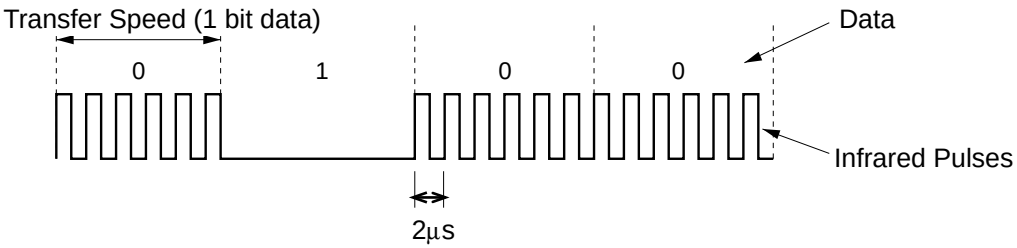


Figure 4-11 Carrier Transmission Format (ASK)

b) IrDA standard

To connect data transmission devices using infrared communication, the protocols physical and transport layers have been standardized.

1) Physical Layer (IrDA-SIR)
2) Dataring Layer (IrLAP and IrLMP)
3) Transport Layer (IrTP)

The Printer does not have a IrTP in the transport layer.
In the physical layer standards (IrDA-SIR), the infrared signal are established.
The physical layer of the IrDA uses RZ signals in the base band format.
As a communication method it employs a start-stop synchronized half-duplex communication and the transfer speeds are 9600/19200/38400/57600/115200 bps.
In start-stop synchronized communication, a start bit (0) and an end bit (1) are added to the 8 bit data. After the 10 bit data has been transformed into RZ signals, the signals are sent to the infrared transmitter.
The infrared receptor releases infrared pulses while the data is Low. When the data is High, the pulses are not released.
The infrared transmitter transforms the received pulses into electric pulses.

2.2 720 dpi Printing/Smoothing Feature

2.2.1 Canon extension mode

In Canon extension mode, the printer driver creates 720 dpi data for the horizontal axis and sends it to the printer, allowing the printer to archive high-quality printing. With a black BJ cartridge installed, the printer driver smoothes the printed character's edges to 720 dpi along the horizontal axis. The 720 dpi data for the horizontal axis is sent to the printer and the edges are smoothed at a higher resolution.

When a color BJ cartridge is installed, a 360 dpi data is represented by a set of two dots printed simultaneously to obtain a 720 dpi resolution. The multi-value data of the pixels processed by the printer driver for color correction, etc., is assigned three values (no printing, single-dot printing, two-dot printing) for each pixel. In the case of two-dot printing, the second dot is printed in the 720 dpi position. As a result, this method enables the printer to archive high degree gradation printing.

2.2.2 Emulation mode

When a black BJ cartridge is installed, the printed character's edges can be smoothed at a high resolution of 720 dpi along the horizontal axis. Dots along the character's edges are added or deleted to smooth their edges. Along the horizontal axis, dots are also overlapped by half a dot. This eliminates jaggies and doubles the equivalent horizontal resolution.

This smoothing feature greatly improves low-resolution, 180 dpi characters. However, it does not give noticeable improvement to TrueType fonts and illustrations.

Note that with a color BJ cartridge installed, the emulation mode smoothing feature cannot be used.

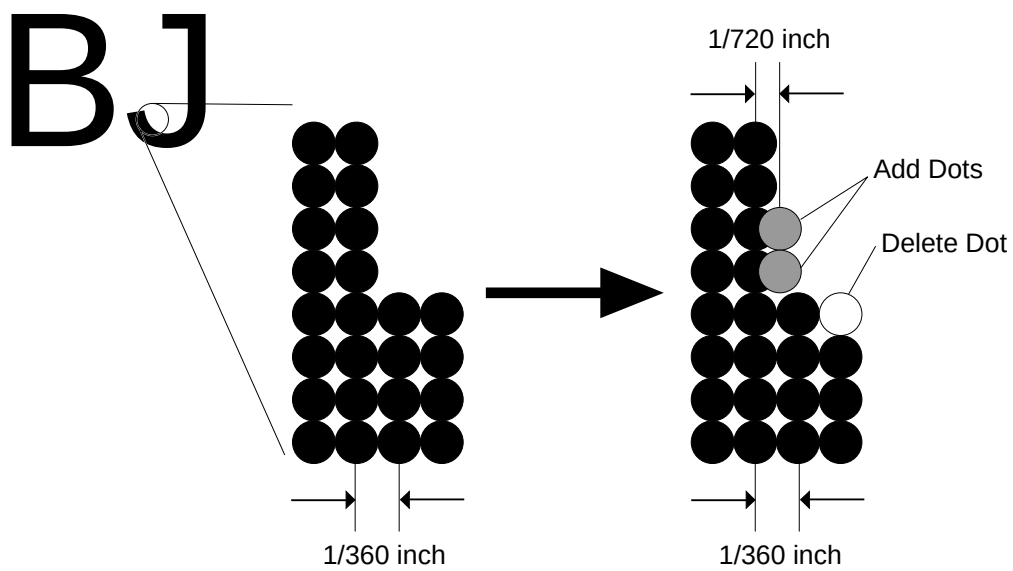


Figure 4-12 720 dpi/Smoothing Function

2.3 Printing Modes

Depending on the cartridge installed, the medium, the printing mode, the resolution, the print data, etc., the printer varies the carriage movement, bubble jet head driving frequency, etc., to attain high-quality printing without any bleeding or shifting in the printout. When the 720 dpi printing/smoothing feature is used, the carriage feed pitch is set to1/720 inch. Although this slows down the carriage speed, the bubble jet head drive frequency (heat frequency) is increased so that the overall printing throughput decreases.

During color printing at a single pass, the different colors printed at the same time overlap, often causing the colors to run. By printing with three passes, color bleeding is less prone to occur since the color printed immediately before is stable by the time the next color is printed over it. When print data is processed internally by the printer, the data is recognized and the number of ink nozzles to be used by the black ink is change automatically.

The printing method for the respective printing modes are listed below.

TABLE 4-1 PRINTING MODES AND HEATING METHODS

With a Black BJ Cartridge

Printing Mode	Carriage Movement	Number of Nozzles	Resolution [dpi]	Carriage Speed [kHz]	Heat Frequency [kHz]
Bk-HS	1 pass	128 nozzles	180	7.82	7.82
Bk-HQ	1 pass	128 nozzles	360	6.43	6.43
Bk-FINE	4 passes	32 nozzles	360	6.43	6.43
Bk-Smoothing	1 pass	128 nozzles	360	3.91	7.82
Bk-HQ (720)	1 pass	128 nozzles	720	6.43	12.86
Bk-FINE (720)	4 passes	32 nozzles	720	6.43	12.86

With a Color BJ Cartridge

Printing Mode	Carriage Movement	Number of Nozzles	Resolution [dpi]	Carriage Speed [kHz]	Heat Frequency [kHz]
Bk & White-HS	1 pass	64 nozzles	180	7.82	7.82
Bk & White-HQ	1 pass	64 nozzles	360	6.43	6.43
Bk & White-FINE	4 passes	16 nozzles	360	6.43	6.43
Color-HS	1 pass	24 nozzles	180	7.82	7.82
Color-HQ	1 pass	24 nozzles	360	6.43	6.43
Color-FINE	3 passes	8 nozzles	360	6.43	6.43
Color-HQ (720)	1 passes	24 nozzles	720	4.73	9.46
Color-FINE (720)	3 passes	8 nozzles	720	6.43	12.83

* When the print resolution is 720 dpi, print data is not thinned.
* When the print resolution is 720 dpi, processing to prevent colors running at the borders is not executed.

2.4 Optimum Printing Direction Control

To prevent vertical misalignment of the printed characters, etc., when print data is printed continuously in the direction of the paper feeding direction, printing is executed with the carriage moving from only one direction.
However, when printing in the paper feed direction is not continuous, since vertical misalignment is not so noticeable, the printing direction is alternated so that printing is also executed from the opposite carriage direction. This improves the throughput.
If four or more successive null rasters are detected in the lower (in the direction of paper ejection) 64 nozzles (24 nozzles with a color BJ cartridge) for the print data in the printer buffer during single-pass printing, printing is executed up to the null raster. From the null raster onward, printing is executed from the opposite carriage direction. From the next raster onward, printing is executed from the same carriage direction until the direction changes again.

2.5 Automatic Emulation Switching

The printer analyzes the control command received from the host computer and determines whether it is in BJ or LQ mode. The emulation mode is thereby switched automatically. The BJ setup utility program can be used to turn on or off the automatic switching of the emulation mode.

Control command recognition

By recognizing the control command received from the host computer, the printer can determine which emulation mode to set. The printer determines the emulation mode when the control command is received at any of the following times:
After the power is turned on and no print data has been received, when no print data has been received for over 10 seconds, or when the printer has no print data.

Switching the emulation mode

The emulation mode is switched automatically at any of the following times:
When the printer has received over 512 bytes of data, when the data reception (even for data less than 512 bytes) has been interrupted for over 3 seconds, or when the power has been turned off before over 512 bytes of data is received or before over 3 seconds of data reception.

Upon shipment from the factory or when the EEPROM is reset, it is set as "Invalid".
Immediately after being "Valid", the emulation mode that was set immediately before will be valid.

There are control commands with which the printer cannot determine the emulation mode to set. If the emulation mode set automatically is not the correct one, use the BJ setup utility program or the manual default setting to cancel the automatic switching of the emulation mode and set the emulation mode manually.

2.6 Lithium Ion Battery Recharging

2.6.1 Switching to recharge mode

The lithium ion battery must always be installed in the printer as the recharging circuit for the battery is inside the printer. When the printer is in stand-by mode or soft power OFF, the battery begins to recharge. Recharging is stopped when printing starts as the power supply from the Universal adapter is limited. Once the printer returns to the stand-by mode, the battery resumes recharging from where it stopped. A total of 6 hours recharging is required for the battery to reach its full capacity. Recharging will begin when all of the following conditions are met.

1) The printer is standing by* or is in soft power off. (Connect the Universal adatper)
2) Ambient temperatures is between 5 and 35°C; battery voltage is more than 6.5V.
3) Recharge current is less than the set value; the open over discharge voltage is less than 12 V.

* When the BJ cartridge is installed, the head cap must be on.
When the scanner cartridge is installed, the driver must be closed.

2.6.2 Recharge protection

The printer checks the following items at 100ms intervals while the battery is recharging. In case of an abnormal occurrence, recharging is immediately stopped and WARNING or ERROR messages will be displayed.

Check Items:

1) Proper Universal adapter drive mechanism
2) Lithium ion battery installation
3) Normal temperature of lithium ion battery
4) Normal voltage of lithium ion battery
5) Recharge time exceeding 6 hours

When an error occurs:

a) Unless both check items 1) and 2) are "NO", recharging will not resume.
b) When check item 3) is "NO", recharging will stop and a FAILED BATTERY WARNING is displayed.
c) When check item 4) is "NO", recharging will stop and a FAILED BATTERY WARNING is displayed.
d) When check item 5) is "YES", recharging is terminated.

2.6.3 Recharge control

When the printer is powered on, the electrical current for recharging is first measured. If the current exceeds the set value, presuming it is a recharge circuit failure, recharging is stopped and a FAILED RECHARGE CIRCUIT ERROR message is displayed.

Also, when the battery begins charging, the soft timer goes on and if the voltage does not reach 7 V after 90 min, recharging is stopped and a FAILED BATTERY WARNING will be displayed. Note that recharging will not start unless the battery and the ambient temperatures are between 5°C and 35°C. NO BATTERY ERROR will be displayed.

Recharging will begin once the battery and the ambient temperatures reach the 5°C and 35°C range.

3. PRINTER MECHANISM

3.1 Overview of the Mechanical System of the Printer

The mechanical system of the printer is comprised of the ink/BJ cartridge, purge section, paper feed section, and the carriage section.
The paper pick up/delivery operation of the mechanical system of the printer and the BJ cartridge maintenance operation are carried out by the paper feed motor and carriage motor.

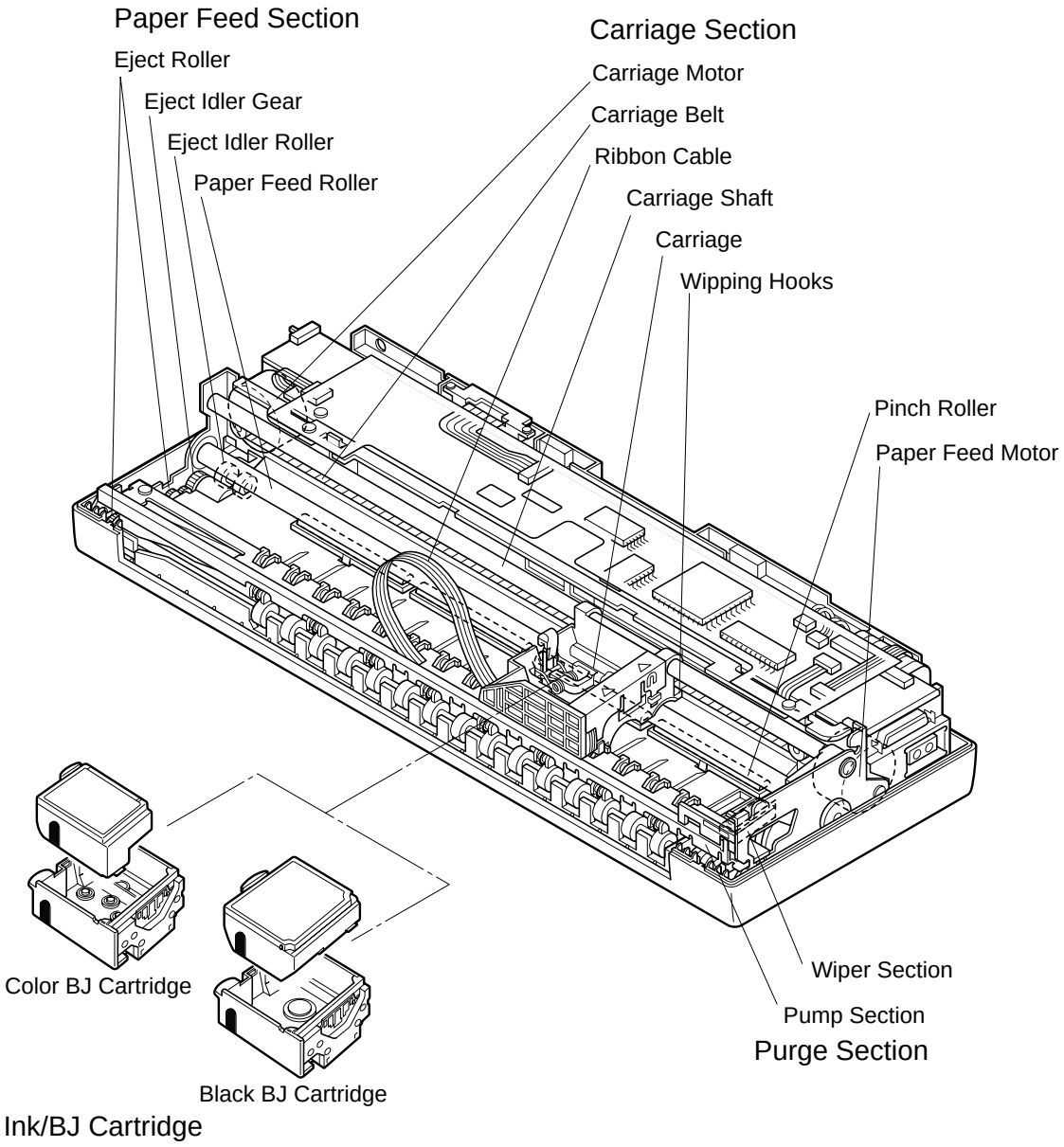


Figure 4-13 Printer Mechanism

3.1.1 Mechanical system configuration

a) Ink/BJ cartridge

The black BJ cartridge (BC-10) has a 360-dpi resolution and 128 nozzles, and the color BJ cartridge (BC-11e) has a 360-dpi resolution, and 64 black nozzles, 24 yellow, 24 magenta, and 24 cyan nozzles. You can print in either black or color simply by replacing the BJ cartridge.

The ink cartridge (BCI-10) for the BC-10 and ink cartridges (BCI-11Bk, BCI-11color) for the BC-11e can be replaced respectively.

b) Purge section

The purge section has a function to maintain the high printing quality of the BJ cartridge bubble jet nozzles.

The purge section consists of the pump section and wiper section.

The pump section sucks ink within the BJ cartridge so that the nozzles are smoothly filled with ink for next printing. The wiper section wipes the head-face of the BJ cartridge.

The purge section is driven by the paper feed motor and carriage motor.

c) Paper feed section

Paper must be fed manually, one sheet at a time.

The built in manual paper feeder can take cut sheets up to Legal size.

When a cut sheet is inserted into the manual paper feeder unit and detected by the paper end sensor, the paper feed roller and pinch rollers which are driven by the paper feed motor, will grab the sheet and feed it partially under the paper feed roller.

Pressing the *RESUME* button will bring the paper to the print start position.

Since the paper feed unit of the printer does not have a manual-paper feed knob, all paper-feeding operations are carried out with the *RESUME* button.

d) Carriage section

The carriage that holds the BJ cartridge is moved horizontally by the carriage motor and the drive belt. The position of carriage is detected by the home-position sensor, which is located on the right side of printer. The printing signals sent from the control board are transferred to the BJ cartridge on the carriage through the ribbon cable.

The wiping hooks on the carriage move the latch lever and wiper lever to start wiping.

3.2 BJ Cartridge

3.2.1 Color BJ cartridge structure

The color BJ cartridge contains a 136-nozzle print head (64 black nozzles, 24 yellow nozzles, 24 magenta nozzles, and 24 cyan nozzles) for four colors. The print head, black ink cartridge, and color ink cartridges are designed to be replaced respectively.

a) Air hole

Each the black and colored ink cartridge has an air hole at the same pressure at the atmospheric pressure.

b) Ink sponge

The ink sponge in the black ink cartridge absorbs black ink. The color cartridge has three ink sponges, each of which absorbs each color ink.

c) Ink supplier

The ink supplier supplies a constant amount of ink to the connection among the head, black ink cartridge and color ink cartridge.

d) Bubble jet head unit

The bubble jet head unit consists of 136 nozzles and signal contacts.
Each nozzle has two heaters located one in front of the other. By controlling the temperature of the heaters, the small and large dots can be printed.

e) Holder

The holder has a partition between the black ink cartridge and the color ink cartridge to prevent color mixture and to prevent from being mounted incorrectly the black ink cartridge and the color ink cartridge.

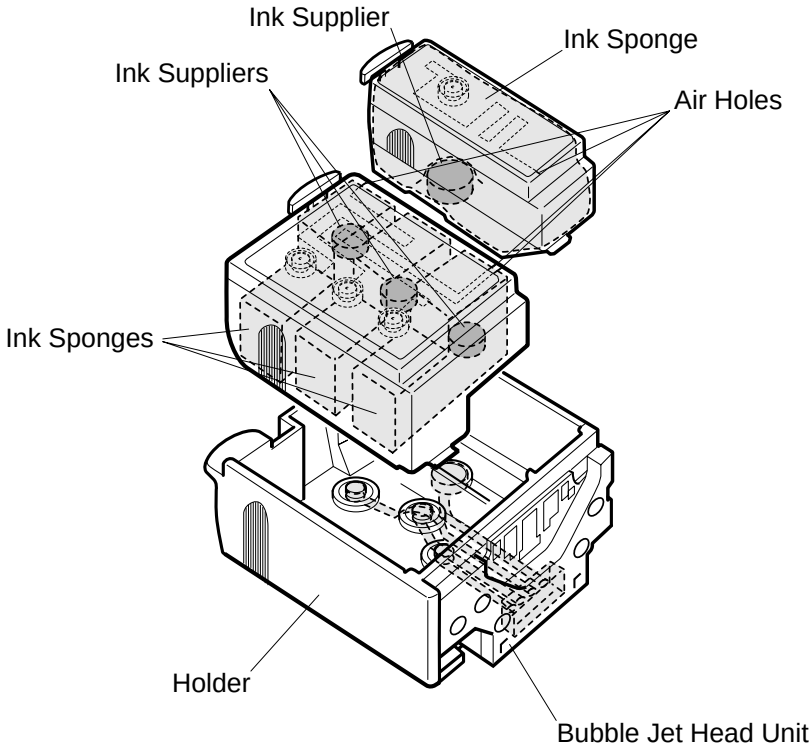


Figure 4-14 Color BJ Cartridge

3.2.2 Black BJ cartridge structure

The black BJ cartridge contains a 128-nozzle print head, and the print head and black ink cartridge can be replaced respectively.

a) Air hole

Air hole is provided in order to keep the ink cartridge at the same pressure as the outer atmospheric pressure.

b) Ink sponge

The ink sponge absorbs black ink.

c) Ink supplier

The ink supplier supplies a constant amount of ink to the connection between the head and ink cartridge.

d) Bubble jet head unit

The bubble jet head unit consists of the 128 nozzles and signal contacts.

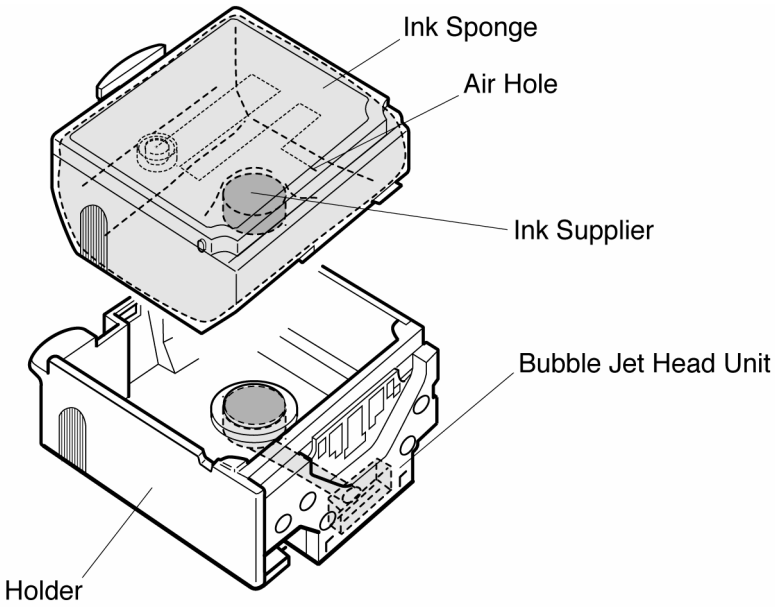


Figure 4-15 Black BJ Cartridge

3.2.3 Bubble jet head-unit structure

a) Bubble jet nozzles

The ink in the ink sponge is filtered through a meshed ink filter, and is fed to the bubble-jet nozzles through the ink path in the holder. When the head-drive-current flows to the heater board of each nozzle, ink is heated up, and bubbles are produced and subsequently form into one large bubble. The head drive current is cut off before a drop of ink is ejected from the nozzle, but bubbling continues due to the heat remaining in the heater and the drop of ink is ejected from the nozzle.
After ejecting the ink drop, the nozzle is refilled with ink.

NOTE

The heaters and their electrical elements within the bubble jet head are formed on a silicon plate by means of semiconductor technology.
A photosensitive resin layer (nozzle wall) and plastic cover are bonded to the silicon plate, and nozzles are made in the photosensitive resin layer by laster.

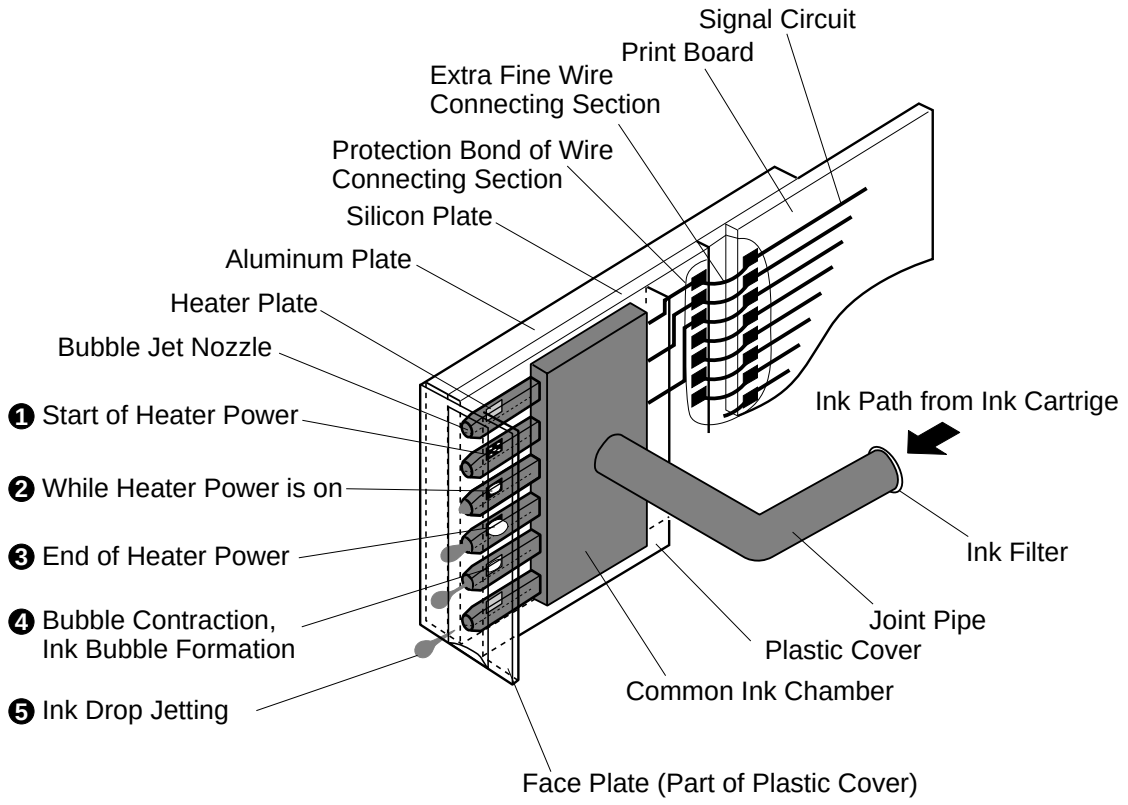


Figure 4-16 Bubble Jet Head

b) Nozzle arrangement

The bubble jet nozzles are arranged in a vertical line at intervals of 1/360 inch.

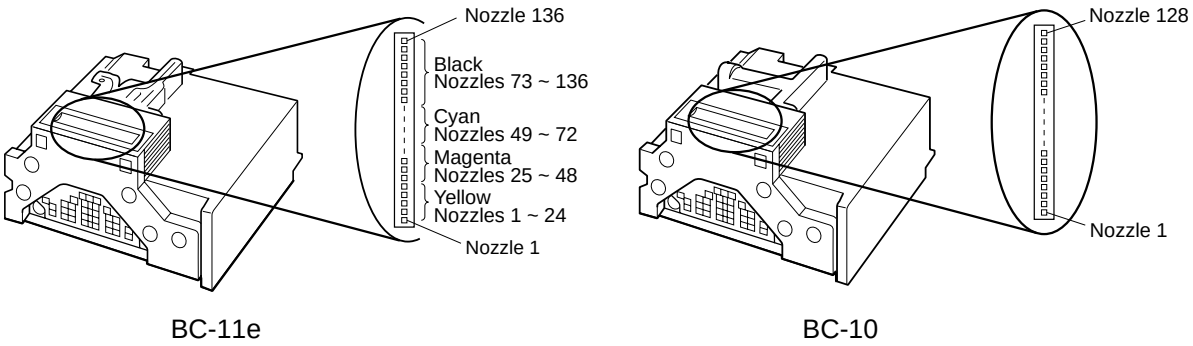


Figure 4-17 Nozzle Arrangement

c) Signal contact part

The signal contact part of the bubble jet head contacts the carriage contact part to transfer control signals including print signal, to the bubble jet nozzles.

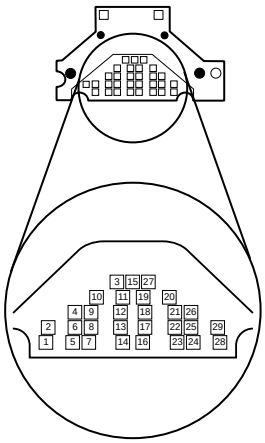


Figure 4-18 Contact Part

TABLE 4-2 SIGNAL CONTACT PART

Pin No.	Signal name	IN/OUT	Description / (scanner cartridge in use)
1	VHG (LAMPG)	...	GND for head drive voltage VH (GND for scanner drive voltage 24V)
2	VHG (LAMPG)	...	GND for head drive voltage VH (GND for scanner drive voltage 24V)
3	MCH0 (N.C.)	IN	Drive signal for temperature control heater (Unused)
4	MCH1 (N.C.)	IN	Drive signal for temperature control heater (Unused)
5	HVH (VLAMP)	OUT	Head drive voltage (Scanner drive voltage)
6	HVH (VLAMP)	OUT	Head drive voltage (Scanner drive voltage)
7	WHT (N.C.)	OUT	Drive signal for subheater (Unused)
8	N.C. (N.C.)	...	Unused (Unused)
9	TOP (TOPS)	IN	Detection signal for rank resistance (Scanner cartridge recognition signal)
10	DIA (C.CHA)	IN	Head temperature sensor (diode) anode (Scanner cartridge recognition signal)
11	ID0 (ID0)	IN	BJ cartridge (black/color) detection signal (Scanner monochrome/color detection signal)
12	ID1 (ID1)	IN	BJ cartridge (black/color) detection signal (Scanner monochrome/color detection signal)
13	HCONT (INKS2)	IN	BJ cartridge (BC-11/BC-11e) detection signal (IS-11/IS-12 detection signal)
14	HVSS (VSS)	...	GND for head's logic drive voltage (GND for scanner's PCB drive voltage)
15	HENBD (N.C.)	OUT	Head's heater drive signal (Unused)
16	EVEN ENB (N.C.)	OUT	Even nozzle heater drive signal (Unused)
17	HENBA (N.C.)	OUT	Head's heater drive signal (Unused)
18	HENBC (N.C.)	OUT	Head's heater drive signal (Unused)
19	ODD ENB (REN)	OUT	Odd nozzle heater drive signal (Scanner's register setting signal)
20	BENB0 (RWR)	OUT	Block enable decoder generation signal (Scanner's clock signal for serial data transfer to register)
21	BENB1 (RDT)	OUT	Block enable decoder generation signal (Scanner's serial data signal)
22	BENB2 (N.C.)	OUT	Block enable decoder generation signal (Unused)
23	HVDD (VDD)	OUT	Head's logic drive voltage +5V (Scanner's PCB drive voltage +5V)
24	HCLOCK (DTCK)	OUT	Clock signal for print data transfer (Clock signal for scanning data input)
25	HLATCH (LNST)	OUT	Timing signal to latch print data (Timing signal to start scanning)
26	HRES (SRES)	OUT	Latch reset signal (Scanning operation reset signal)
27	HENBB (N.C.)	OUT	Head's heater drive signal (Unused)
28	HDATA (DT)	OUT	Print data (Scanning data)
29	DIK (C.CHK)	IN	Head temperature sensor (diode) cathode (Scanner cartridge recognition signal)

3.2.4 Head-maintenance function and structure

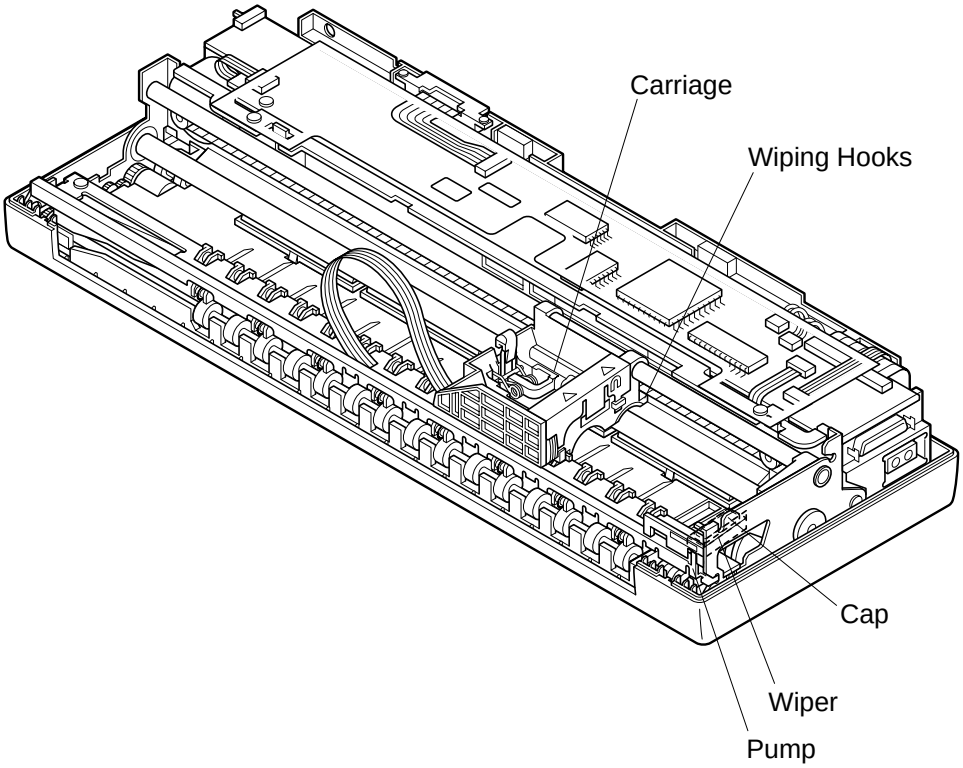


Figure 4-19 Purge Section

a) Cleaning function

Cleaning operation is performed to correct the print quality problem, which is caused by none-ejection of ink, and to prevent the print defects resulting from improper ink ejection from the BJ cartridge head nozzles.

Cleaning operation includes purging, wiping, capping, and maintenance jet. The cleaning time varies according to the type of BJ cartridge installed and the printer status.

The printer carries out cleaning in the following cases:

TABLE 4-3 CLEANING INK CONSUMPTION

Printer Status		Approx. Ink Consumption (g)	
		BC-10	BC-11e
Printer turned on by *POWER* button	1) First time use of BJ cartridge	0.36	0.52
	2) Less than 72 hours from last cleaning	0.12	0.18
	3) More than 72 hours from last cleaning	0.24	0.26
BJ cartridge replaced or ink cartridge replaced		0.24	0.52
RESUME button pressed	1) Cleaning	0.12	0.26
	2) Head refreshing	0.24	0.52

The cleaning operation is performed in the purge section. The cap, cylinder, and pump are operated by the gears and cams, which are driven by the paper-feed motor. (See *Part 4: 3.3 Purge Section Structure. (page 4-28)*)

b) Purging

Purging is performed to correct/prevent the non-ejection of ink, which is caused by unnecessary bubbles and dust on the head faceplate.
The cap and pump in the purge section are used for purging operation.

c) Capping

Capping operation is performed to correct/prevent the non-ejection of ink, which is caused by the dried-up of ink inside nozzles.
Cap is pressed against the head faceplate when the carriage moves to the home position.
When the cap moves away from the faceplate, waste ink in the cap is sucked by purging operation. The sucked ink is absorbed by the absorber in the pump and finally absorbed by the waste ink absorber.
Capping is performed in the following cases:

1. When the printer is turned off with the *POWER* button
2. When the printer receives no data or commands for 1 minute while paper is set in the paper feeder.

d) Wiping

Wiping operation is performed to correct/prevent the non-ejection of ink, which is caused by paper-powder on the head faceplate or by the foreign materials in ink.
The wiper is set and released by wiping hooks on the carriage. When the carriage moves from the home position, the wiper touches the aluminum plate of the head, removes the stain from the wiper and then wipes off the ink from the faceplate.
Wiping operation is performed in the following cases:

1. When the number of dots printed or the print time exceeds the preset value during printing
2. After purging
3. Before capping

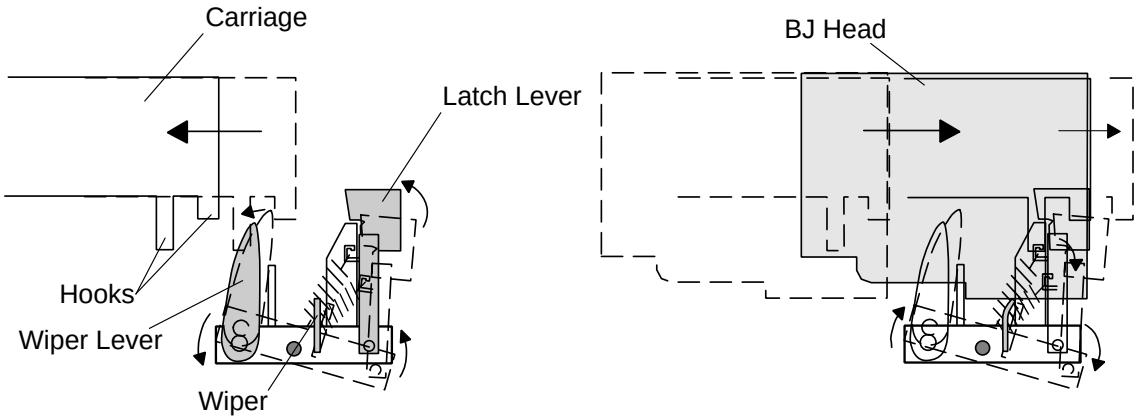


Figure 4-20 Wiping Function

e) Maintenance jet

The maintenance jet is performed during cleaning to remove bubbles inside nozzles and the dust near ink ejection apertures.
In this operation, the ink is ejected from the head into the cap and sucked into the waste ink absorber through the pump section.

3.3 Purge Section Structure

3.3.1 Configuration

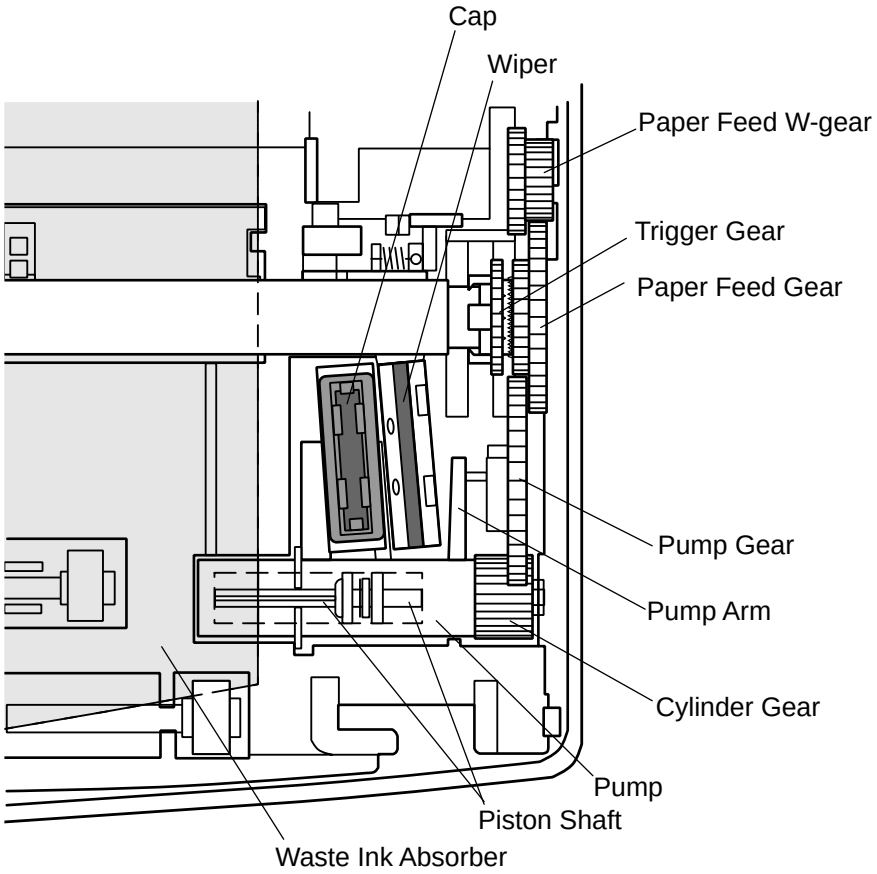


Figure 4-21 Purge Section Structure

a) Cap section

When the carriage is at the home position, the cap is pressed against the print head faceplate to cap the head. The rubber cap connects to the pump, and ink is sucked from the head by the pump during cleaning. The sucked ink is absorbed by the ink absorber in the pump and finally collected in the waste-ink absorber. The cap is moved by the p pump arm, which is driven by the pump gear. Therefore, the

b) Wiper section

The wiper wipes excess ink off the print head faceplate when the carriage moves from left to right. The wiper is moved up or down by the projections on the carriage. The ink attached to the wiper is removed by the aluminum plate on the head. Moreover when the wiper comes down, the ink remaining on it is splashed on the pump gear.

c) Pump section

The pump contains a rubber piston, whose piston shaft is linked with the cylinder gear. The cylinder gear is rotated by the pump gear. Then the pump is opened to absorb the ink collected in the cap into the waste ink absorber. The ink in the cap flows into the absorber in the pump, and then into the waste ink absorber.

d) Waste ink absorber

The ink sucked from the cap and the ink collected in the pump are sucked into the absorber in the pump, and absorbed into the waste-ink absorber.

3.3.2 Operation

The purge section is driven by the paper feed motor.
The paper feed motor drives the paper feed gear through the paper feed double gear. When the carriage moves to the right from the home position, the trigger gear rotates along with the paper feed gear, which rotates the pump gear and cylinder gear. At this time while the ink is stored in the cap, the cylinder gear rotates so as to move the piston shaft to the right. After that, the piston shaft is moved to the left so that the ink in the cap is absorbed into the waste ink absorber.
The cap moves up and down as the pump arm moves along the pump gear cam. (Capping)

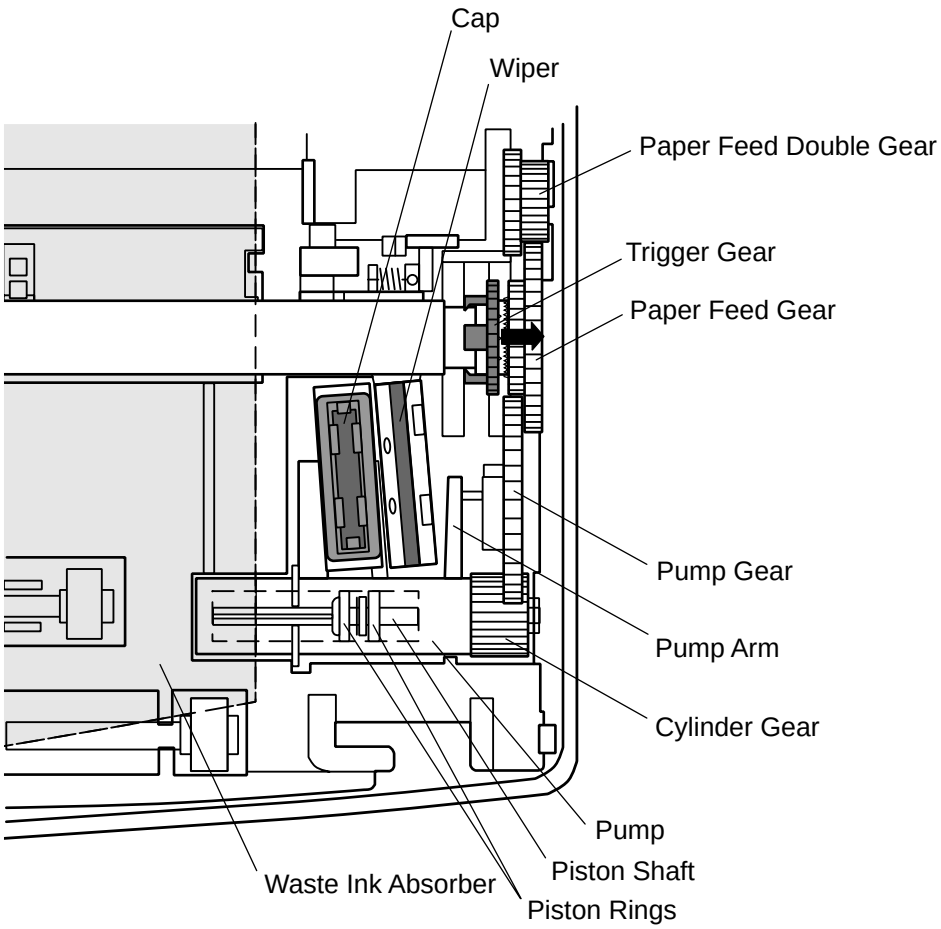


Figure 4-22 Purge Operation

3.4 Paper Feed Mechanism

3.4.1 Outline of paper feed mechanism

In this printer paper is fed manually, one sheet at a time.

The paper feed mechanism of the printer is divided into the paper pick-up section and printing/paper-delivery section.

These operations are driven by the paper feed motor which feeds the paper at a line feed pitch of 1/360 inch.

a) Paper pick-up section

The paper pick-up section consists of the paper feed roller and the pinch rollers. Paper is fed through the paper feed slot, one sheet at a time. When the paper is detected by the paper end sensor and reaches the contact point of the paper feed roller and the pinch rollers, the printer acknowledges the presence of paper. To bring the paper to the print start position, press the *RESUME* button. The paper feed roller driven by the paper feed motor will feed in the paper to its set position.

b) Printing/Paper delivery section

The printing section consists of the paper feed roller, the pinch rollers on the platen and the carriage. Each part is responsible for ensuring that a certain head-to-paper distance is maintained.

The paper delivery operation section consists of the eject roller and spurs that deliver the printed paper. Paper set to the print start position by the paper feed roller and the pinch rollers will be printed over the platen and delivered by the eject roller and the spurs. This printer has a sensor that detects if paper has been delivered correctly. Do not attempt to back feed paper through the paper delivery slot as this may damage the sensors.

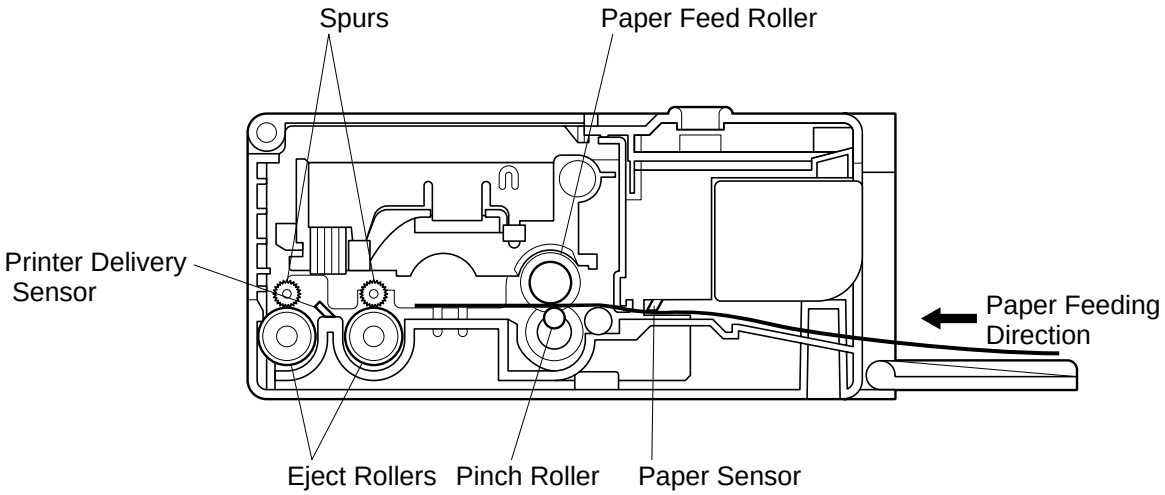


Figure 4-23 Paper Pass

c) Automatic head-to-paper adjustment

A coil spring pushes up the eject idle roller and the eject roller towards the paper feed roller and the spurs to maintain a constant head-to paper distance regardless of paper thickness. Hence, a paper thickness lever is not necessary and there is no need to adjust the carriage position according to paper thickness.

3.5 Carriage Section

3.5.1 Carriage section function

a) Ink/BJ cartridge mounting function

The carriage holds the BJ cartridge and connects it electronically to the control board through the carriage ribbon cable. When the power is off, the carriage is locked at the capping position where the carriage is locked by the lock arm.

b) Carriage drive function

The carriage is moved horizontally by the carriage belt, which is driven by the carriage motor.

c) BJ cartridge maintenance function

The printer performs the wiping operation and cleaning operation for the BJ cartridge by controlling the position of carriage.

1) Setting and releasing the wiper

When the carriage moves horizontally, the wiper lever and the latch lever in the purge section are operated.

2) Start of the cleaning operation

The BJ cartridge cleaning starts when the carriage moves horizontally and the trigger gear is engaged with the paper feed gear to drive the pump gear.

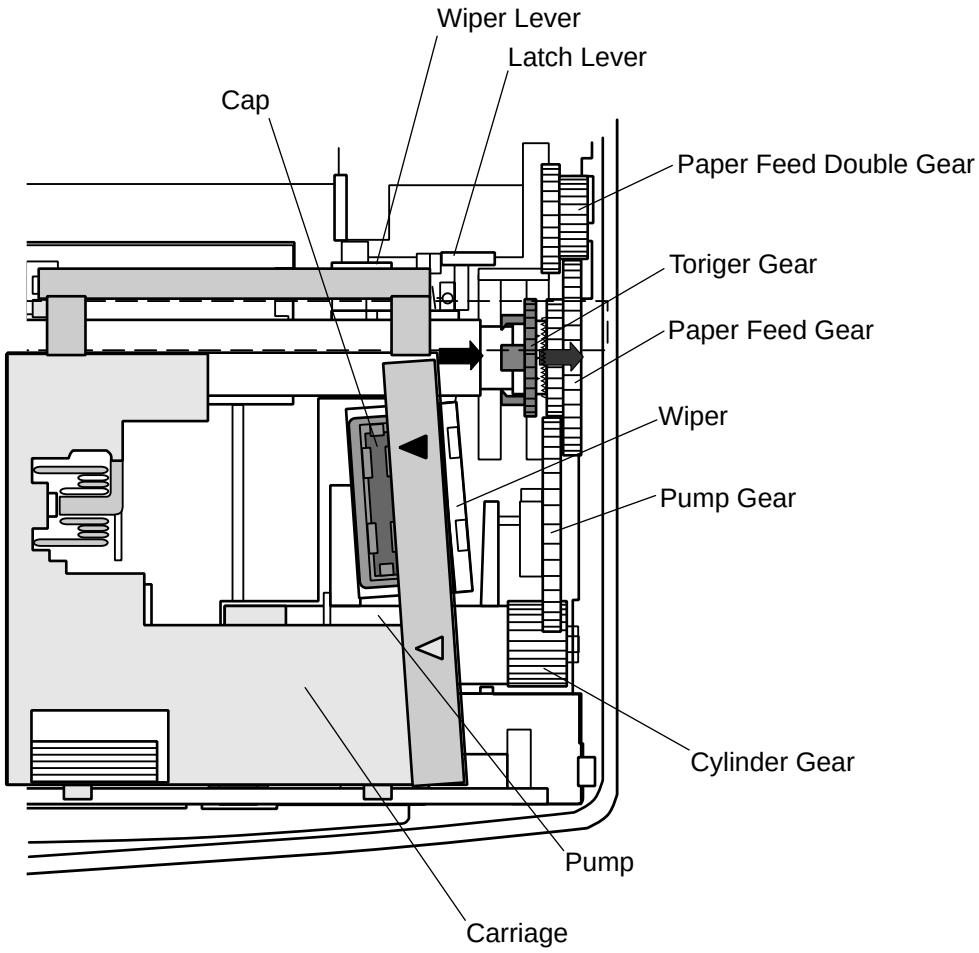


Figure 4-24 Cartridge Section Function

3.5.2 Carriage section structure

a) BJ cartridge mounting section

The BJ cartridge is fixed to the carriage by the carriage contact spring.
When the BJ cartridge is mounted on the carriage, the contacts of the carriage ribbon cable connect with the signal contacts of the BJ cartridge to transfer printing signals sent from the control board.
There are wiping hooks that set and release the wiper on the back of the carriage.
There also is a home position edge that shields the home position sensor on the chassis on the back of the carriage.

b) Carriage drive section

The power from the stepping type carriage motor moves the carriage horizontally with the carriage belt. After the home position sensor attached to the rear of the carriage detects the home position edge, the carriage is controlled with the stepping pulses transmitted to the carriage motor. The pulses driving the carriage motor are controlled by the MPU section to have the optimum pulse width. (PWM control) This reduces the operating noise. Also, if the print position is shifted mechanically, it is corrected automatically, the home position sensor detects the home position edge on the carriage, and the print start position is shifted with software. This adjustment is conducted when the initial operation is performed after the printer is powered on by the *POWER* button, or when the printing operation is performed after the print mode is changed.

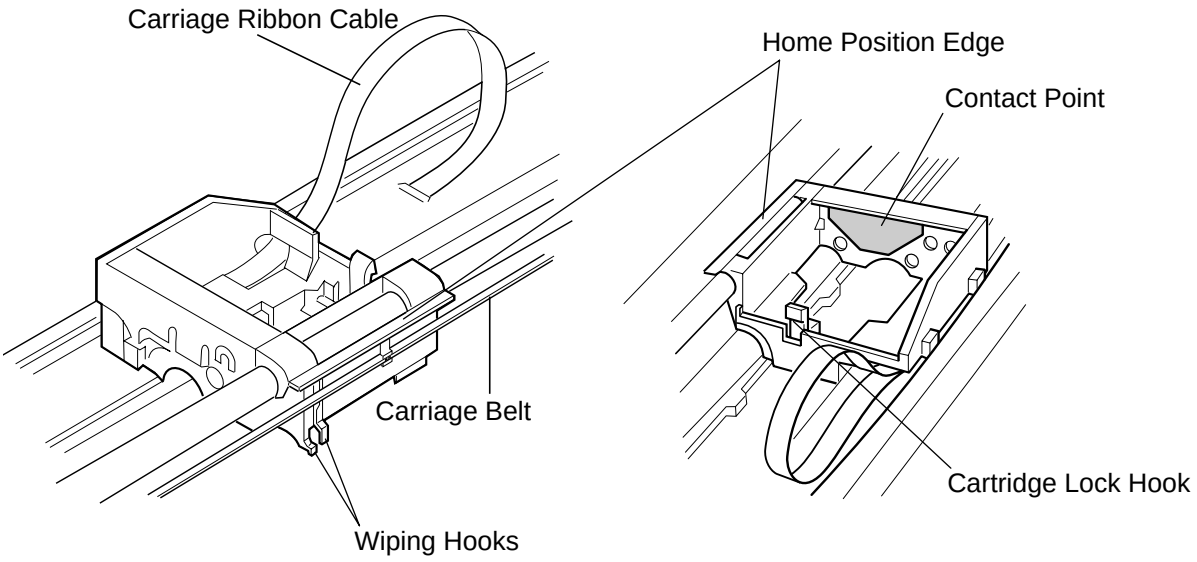


Figure 4-25 Carriage Section Structure

4. PRINTER ELECTRICAL SYSTEM

4.1 Overview

The electrical system is handled by the control section and the power supply section. The printer control section converts the data from the computer into print signals or printer operation signals and drives the BJ cartridge and motors while monitoring the status of the sensors.

The power supply unit converts the AC power to DC output using the Universal adapter and converts it into drive power for the motors, IC, head etc. This drive power is also used in the recharging circuit to recharge the lithium ion battery.

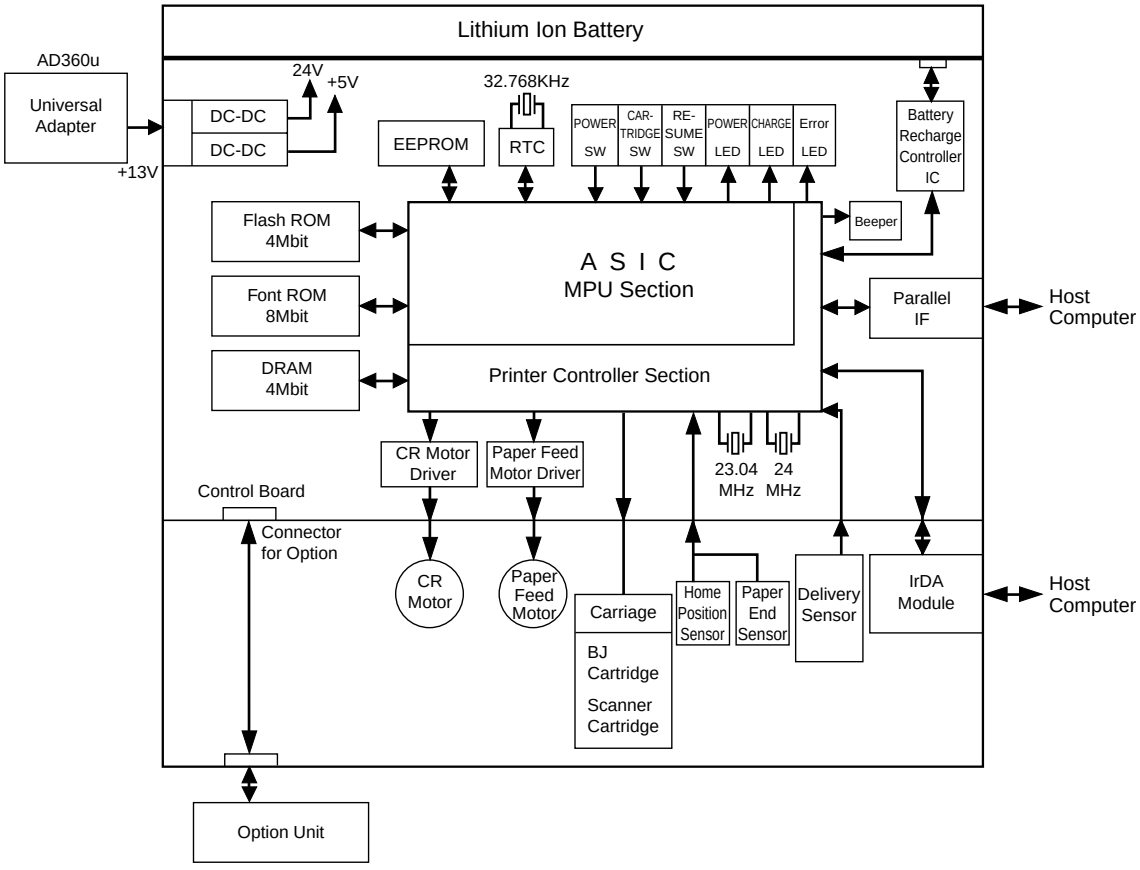


Figure 4-26 Printer Block Diagram

4.2 Signal Control Section
4.2.1 Control board block diagram

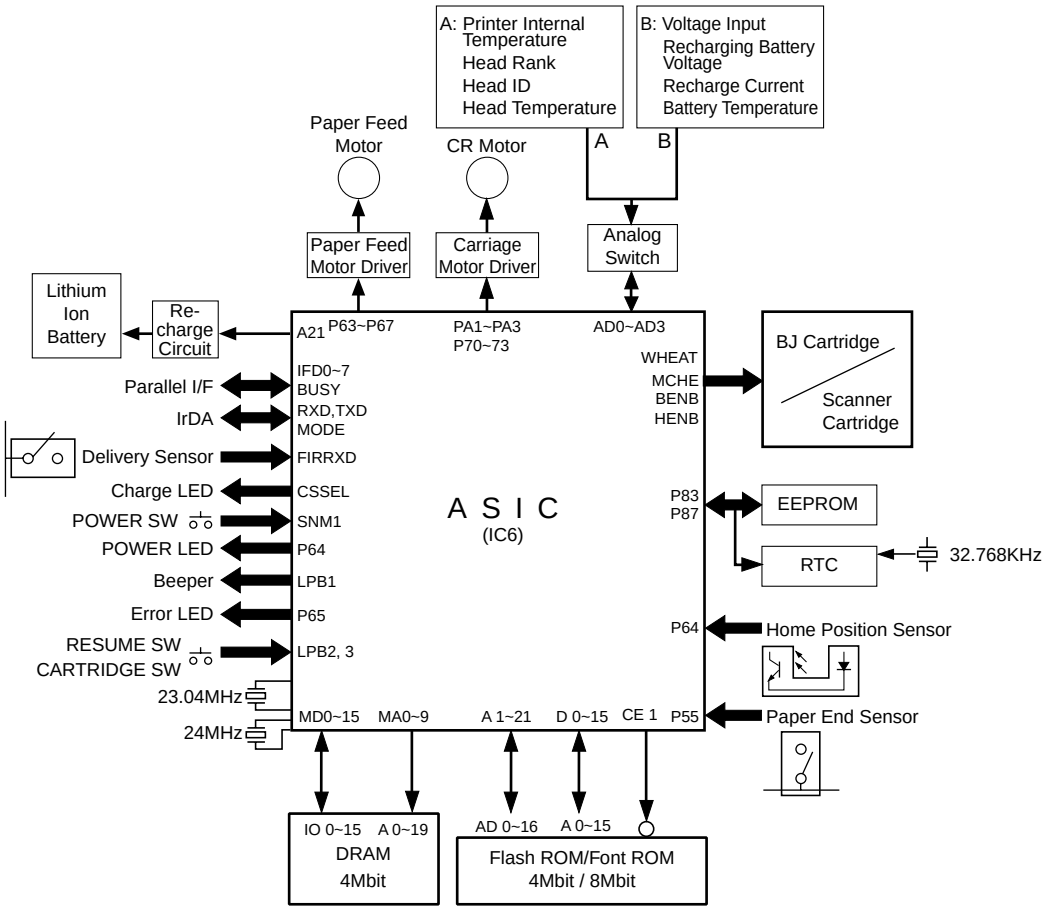


Figure 4-27 Control Board Block Diagram

4.2.2 Control section components

a) ASIC (IC6)

The ASIC is comprised of the MPU section and the printer controller section. It has a built-in 16-bit CPU and the operating synchronized frequency is 23.04 MHz. The printer controller's operating synchronized frequencies are 23.04 MHz and 24.00 MHz. The MPU section and the printer controller section operate in synchronization.

1) MPU

Address bus

The 21-bit address bus ports is connected to an 4 M-byte flash ROM and 8 M-byte FONT ROM. The flash ROM/FONT ROM synchronizes with the read signals output by the MPU and the 23.04 MHz clock signal. The printer controller then selects the chip.

Data bus

Like the address bus, the 16-bit data bus port is connected to the 8 M-byte FONT ROM.

Stepping motor controller

The stepping motor controller outputs the carriage motor micro-step control signals and paper feed motor's double-phase exciter drive signals and single-and double-phase exciter drive signals.

Interrupt controller

For external interruption, the MPU has *POWER* button on/off switch, data reception, initial interrupt request and other signals. Each signal is inputted to each port and interrupt processing is executed.

A/D converter

The following analog signals are detected by the built-in A/D converter. The signals from four A/D ports are divided into two groups (A and B) with 4 signals per group. Use the external analog switch to select a group.

A/D port	Group A	Group B
AD0	Head ID	Voltage input
AD1	Head Temperature	Recharging Battery Voltage
AD2	Head Rank	Recharge Current
AD3	Printer Internal Temperature	Battery Temperature

Use the output LPC2 as the analog switch. All inputs will be connected to the A/D port of ASIC when LPC2 is set to either "0" for Group A or "1" for Group B.

EEPROM write/read control

The TE-CLK signal output from the ASIC is EEPROM's clock signal. The recorded data in the EEPROM is read using the TOE signals. The read-out data is output from the ASIC by the TEDIO signals and written on the EEPROM using EDO signals.

I/O port

The following signals are inputted to the input port: (i) signals from the *POWER*, *RESUME* and *CARTRIDGE* buttons and (ii) EEPROM read signals. The output signals outputs flash ROM rewrite signals and recharge LED ON/OFF signals.

2) Printer controller section

The printer controller contains the parallel interface controller, print head controller, scanner head controller, CR motor controller, paper feed motor controller, buffer controller, DRAM controller, recharge controller, etc. It operate in synchronization with an external 23.04 MHz external clock input.

Interface controller

The interface controller receives from the computer, 8-bit parallel data which is synchronized with the data strobe pulse (STROBE) through the BUSY/ACKNLG handshake. It also controls IrDA and ASK interface signals.
The data received through the interface is stored in the DRAM's receive buffer and analyzed by the ASIC.

DRAM controller

The DRAM controller is a DRAM-specific bus separate from the MPU section bus. It controls the 4 M bit DRAM's 10-bit address/16-bit data bus and also executes read/write control, RAS/CAS control, and refresh control.

Buffer controller

The buffer controller automatically writes the received data to the receive buffer on the DRAM, manages the receive buffer's remaining capacity, automatically reads the print buffer, and clears the data after it is read.

Print head controller

The print head controller converts the print data read from the DRAM's print buffer from parallel to serial and sends the serial data to the print head. For large and small dot printing, the print head controller outputs 4 heat-enable signals (HENBA, HENBB, HENBC and HENBD). Each enable signal can be output independently.

Scanner cartridge controller

The scanner cartridge controller tries to operate the printer as a scanner once it receives a scanner activation message from the host computer. In the scanner mode, data cannot be removed from the receiver buffer.

Recharge controller

The recharge controller controls the battery recharge controller IC which is driven by the recharging electrical current, temperature and voltage values transmitted through the A/D port.

I/O port

The input port contains the home position sensor, the delivery sensor, the paper end sensor, and a data input signal for the optional ASF unit. The output port controls the beeper, ERROR LED on/off signals, battery recharge on/off signals, battery power output on/off signals, A/D port analog switch signal, CR exciter motor, drive signals and a data output signal for the optional ASF unit.

b) Flash ROM/FONT ROM (IC9/IC10)

This printer has a flash ROM as the control board lacked space for an EPROM. The 4 M-byte flash ROM contains printer control programs and program-rewrite loading programs. The 8 M-byte FONT ROM contains the bitmap font data for printer control.

c) DRAM (IC4)

Controlled by the ASIC, the 4 M-bit DRAM is used as a receive buffer, download buffer, print buffer, and working area.

d) Paper feed motor driver IC/Carriage motor driver IC (IC15/IC16/IC12)

The paper feed motor driver IC (IC15/16) is a constant-voltage bipolar driver IC. There are two types of signals that are outputted from the ASIC: a paper feed motor drive control signal and a head drive control signal. The motor signal output from the ASIC supplies a constant voltage to each motor phase to control paper feed motor drive. Also the low voltage output to each terminal controls the head drive. The carriage motor drive IC (IC12) is a constant-voltage bipolar driver IC. It is controlled by the motor signals output from the ASIC that supplies a constant voltage to each phase.

e) EEPROM (IC14)

Controlled by the ASIC, the EDO, TE-CLK and TIDIO signals, the EEPROM data is read into the ASIC when the hardware/software is powered ON. The data is written onto the EEPROM when the hardware/software is powered OFF. The data stored in the EEPROM waste ink absorption amount, fed sheets, BJ cartridge installation and removal frequencies, function settings, etc.

f) Battery Recharge Controller IC (IC2)

In the early stages of recharging, the battery recharge controller first controls the supply of constant electrical current from the Universal adapter until the set voltage is reached. This constant current is set to 400 mA. Once the voltage rises to a predetermined value, the controller switches to maintain a constant voltage. Full charge is detected by the controller when the recharge current starts to decrease as it reaches full capacity. Maximum recharging time is set to 6 hours and recharging is automatically stopped beyond 6 hours as the soft timer keeps track of the total recharging time.

4.3 Power Supply Section

4.3.1 Block diagram of power supply section

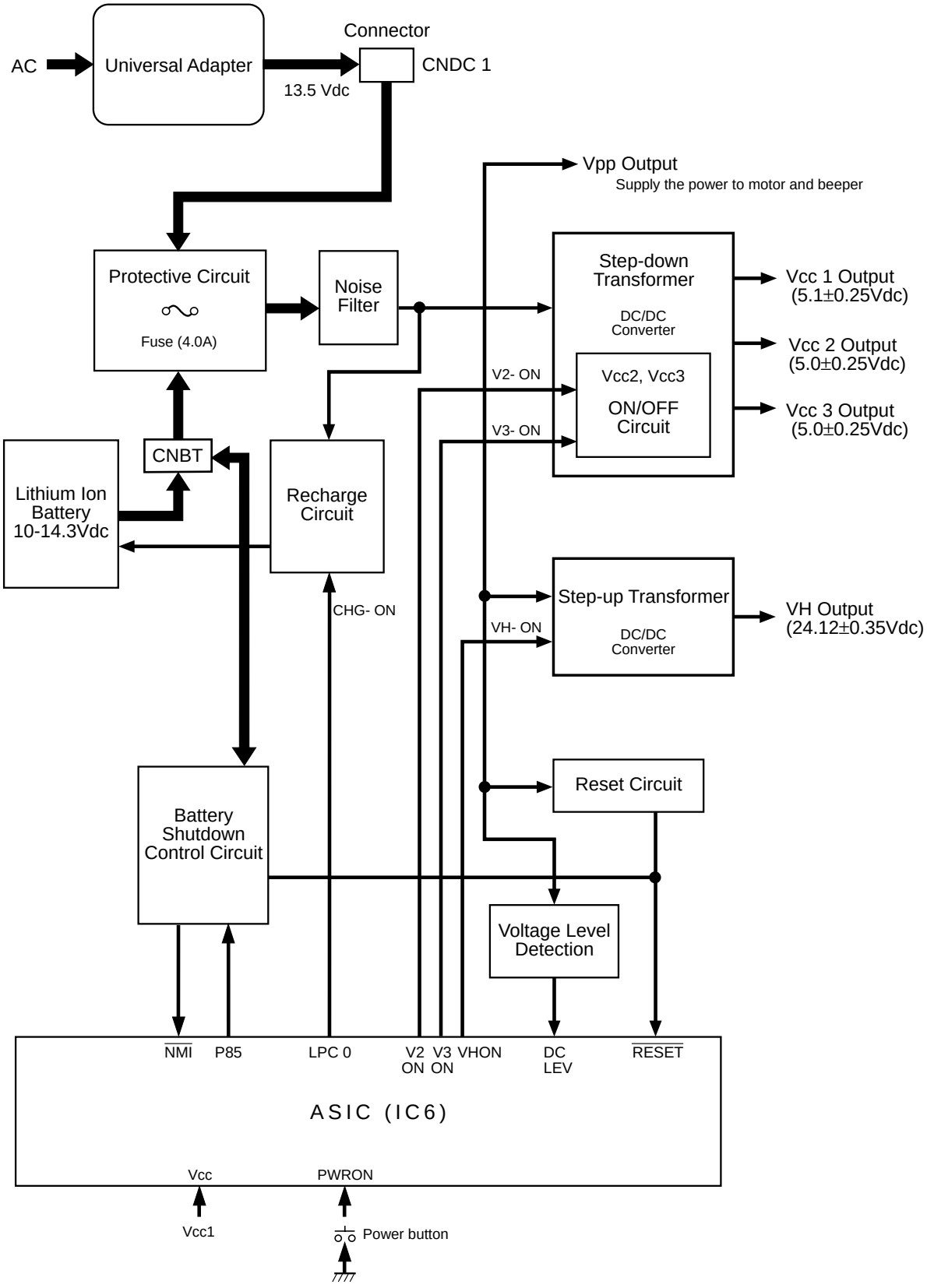


Figure 4-28 Block Diagram of Power Supply Section

4.3.2 Power supply section structure

a) Input power supply

The voltage input to the power supply section is 13.5 ± 0.5 VDC. It is supplied by two sources: the Universal adapter and the lithium ion battery.
When the DC plug is inserted into the power connector, 13 VDC is supplied to the power control section on the control board.

b) Vcc1 output

The Vcc1 is +5VDC output produced by the DC/DC converter. Vcc1 is supplied to operate the reset IC, ASIC, ROM, RAM, timer IC, EEPROM, and as a pull-up power supply for the *POWER* button. It is always supplied, even after the power switch is OFF.

c) Vcc2 output

The Vcc2 (+5VDC) output controlled by the ASIC is used to operate the IC in the print head. The ASIC outputs a signal that turns Vcc2 output off to stop it when the BJ cartridge is replaced, the ink cartridge is replaced, or the printer is turned OFF with the *POWER* button.

d) Vcc3 output

The Vcc3 (+5VDC) output controlled by the ASIC is supplied to operate the interface, paper sensor, and HP sensor. When the *POWER* button is turned OFF with the *POWER* button, the ASIC stops the Vcc3 output.

e) Vpp output

The DC input voltage supplied from the Universal adapter or lithium ion battery becomes Vpp output to drive the carriage motor driver and the paper feed motor driver.

f) VH output

The VH (24.12 VDC ± 0.35 VDC) output generated by the DC/DC converter is supplied to the print head and the paper feed driver. This is monitored by the ASIC. The VH output voltage is supplied to the subheater temperature adjustment driver transistor and the nozzle heater temperature adjustment drivers transistor in the BJ cartridge and the paper feed motor driver. The DCLEV, which is generated by dividing the VH output using a DC/DC converter, is fed back to the ASIC and the ASIC monitors the VH output voltage to be kept at approx. 24.12 VDC.

4.3.3 Lithium Ion Battery Recharging Circuit

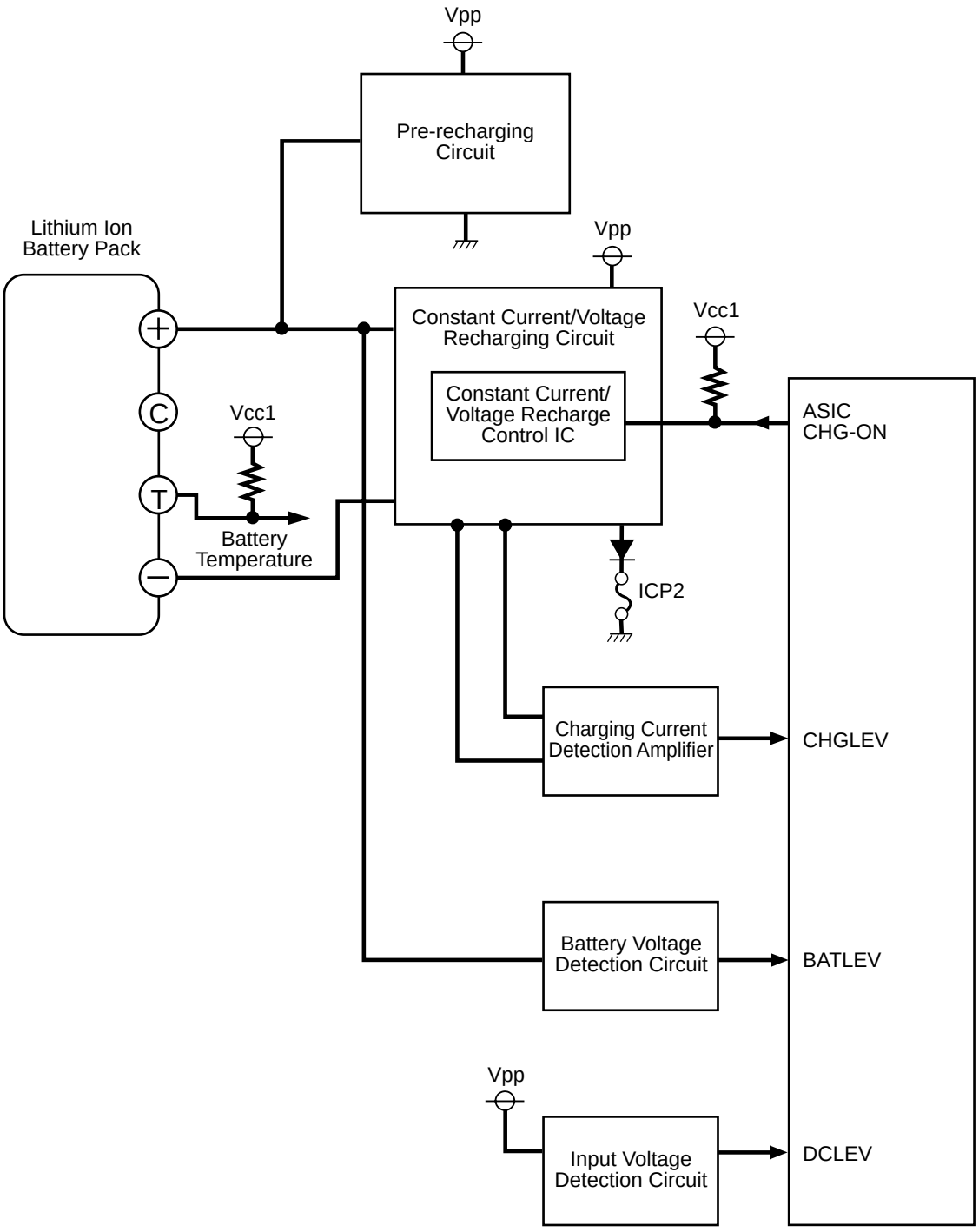


Figure 4-29 Lithium Ion Battery Recharge Circuit

a) Pre-recharging Circuit

When the lithium ion battery voltage is low, the pre-recharging circuit and small amounts of electrical current are used to raise the voltage. Once the voltage level rises to the normal level, this circuit is stopped.

b) Constant Current/Voltage Recharging Circuit

Constant current is maintained until the lithium ion battery voltage reaches 12.3 V. Once it reaches 12.3 V, the control mode switches to constant voltage to maintain a stable 12.3 V supply. When the voltage is less than 6 V, the ICP2 blocks recharging and the battery will not start recharging even after receiving a charge ON signal.

4.3.4 Lithium Ion Battery

a) Properties of the lithium ion battery

Advantages of a lithium ion battery are the high concentration of electrical energy, high rate of charge preservation and no memory effect. Also, it contains no toxic compounds such as cadmium, lead or mercury.

However, once the battery is over discharged beyond zero charge, the battery may deteriorate rapidly. Under high temperatures, self-discharge is accelerated and this may lead to rapid over discharge. Chances of reviving an over discharged battery that was left unused for an extended period of time is very slim. Over discharge can be prevented by regularly charging the battery. The battery must not be stored in high temperature places.

b) Recharging mechanism

The recharging circuit for the battery is found on the printer. With power supply from the Universal adapter, the battery is charged using the constant current/constant voltage recharging process. The battery is recharged automatically when the printer is either OFF or ON but in stand-by. When a BJ cartridge is installed, recharging will take place only if the BJ cartridge is capped. In other words, recharging will stop temporarily during printing or when the cartridge is uncapped. When the scanner cartridge is installed, recharging takes place when the scanner driver is not operating.

The voltage of the Lithium ion battery cannot be measured directly. Low charge is indicated by the charge indicator lighting green when the battery is installed in the printer and the Universal adapter is plugged.

c) Battery temperature detection

The thermistor inside the lithium ion battery pack measures the internal battery temperature and detects whether the battery is installed or not. This thermistor is connected between the T terminal and negative terminal of the battery pack. ASIC uses the A/D value of the thermistor's output voltage, THBAT, to determine whether the battery temperature is normal. If it is, the recharging will begin.

TABLE 4-4 BATTERY TEMPERATURE

Battery temperature THBAT	A/D value	Determination by THBAT
-30°C ≥ THBAT	965~1024	No battery
0°C ≥ THBAT	814~1024	Cannot start recharging
0°C ≥ THBAT	835~1024	Recharging stop
45°C ≥ THBAT>0°C	408~813	Permission to start recharging
THBAT > 45°C	0~407	Cannot start recharging
THBAT > 60°C	0~336	Recharging stop

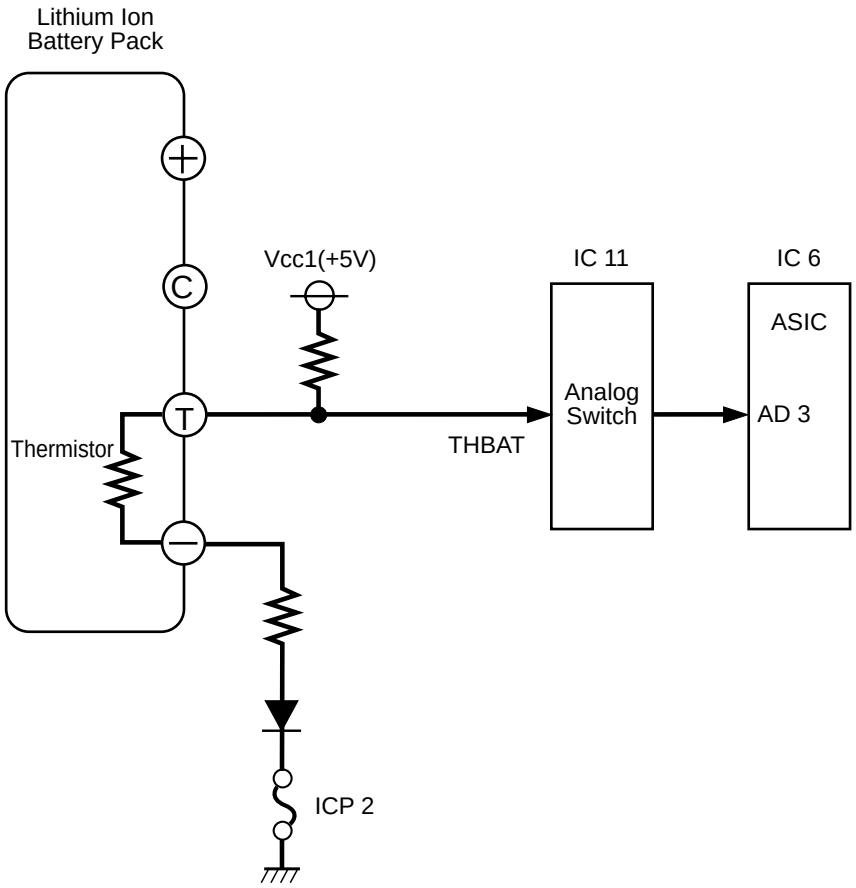


Figure 4-30 Battery Temperature Detection Circuit

5. DETECTION FUNCTION

The printer uses HP sensor, paper end sensor, delivery sensor, inside temperature sensor, and head temperature sensor. Also, the capacity of the waste ink absorber is stored in the EEPROM. When the absorber is about to become full a warning is given and when full an error will occur. The printer detects the level of the ink remaining in the ink cartridge by counting the number of dots ejected, and indicates when the ink runs out. The ink remaining detection function operates only when the setting for the BJ controller is ON.

5.1 HP Sensor

The photointerrupter type HP sensor detects the edge of the carriage in order to detect the carriage position.

After the carriage senses the edge, it moves to the right, and the print head is capped at its home position.

5.2 Paper End Sensor

The switch type paper end sensor detects the presence of paper.

5.3 Delivery Sensor

The switch-type sensor detects whether paper has been delivered.

5.4 Temperature Sensor

The temperature sensor on the control board detects the temperature inside the printer. The ASIC detects a change in the thermistor resistance that changes along with changes of the inside temperature. The ASIC converts the input analog value, which is a voltage converted from the thermistor resister to a digital value with the internal A/D converter. This value is used to control the pulse width of the head drive control signal and temperature adjustment signal.

5.5 Head Temperature Sensor

The head temperature sensor in the print head detects the head temperature. The ASIC detects the diode sensor that changes as a change in voltage along with changes in the head temperature. The ASIC converts the input analog value to a digital value with the internal A/D converter. When the head temperature rises excessively, the digital value becomes large, which can stop ejecting the ink from the head.

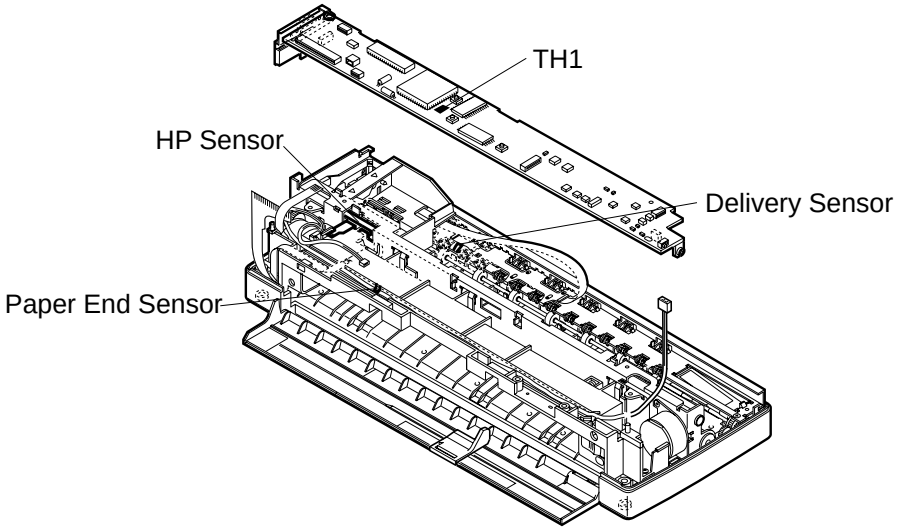


Figure 4-31 Sensor Location

5.6 Waste Ink Level Detection

Ink ejected by the maintenance jet or collected from purging during recovery is absorbed by the waste ink absorber. The total amount of ink consumed is calculated by adding the number of dots ejected and the recovery counts. The EEPROM waste ink counter is divided into the following sub-counters:

Maintenance counter	ng counter
Purge counter (for non-volatile substance)	10 mg counter
Purge counter (for volatile substance)	10 mg counter

During the various types of maintenance operations, the dots ejected are counted and recorded in the ng counter. When the ng counter exceeds 100,000,000 ng (100 mg), 50 mg will be added to each of the non-volatile and volatile counters.
During the various types of recovery, all the ink drawn from the print head is read and recorded separately as non-volatile and volatile counters. All recordings for volatile substances are calculated based on the elapsed time. Amount less than 10 mg will be recorded in the ng counter.

Volatile Substance = Evaporated amount × (1-25/non-volatile material)

When the reading for the ng counter and 10 mg counters reach the 84000 mg limit, an WASTE INK ABSORBER error will occur, causing the printer to stop.

5.7 Remaining-ink Level Detection

This function detects the remaining ink level and notifies the user that the ink has run out. (The function is enabled or disabled by the BJ controller.)
The dot counter for each color of ink in the ASIC counts the number of dots ejected. When cleaning is performed, ink is consumed by purging, and the total number of dots and recovery counts is written into the EEPROM. When the power is turned off, paper is delivered out, or cleaning operation ends.
The ASIC reads the EEPROM contents when the printer is turned on with the *POWER* button. If the remaining ink level reaches the prescribed value, a caution will appear, notifying the user that the ink is low (the printer can operate even after a caution is displayed). Change the settings in the original printer driver to the replacement mode before replacing an ink cartridge. The driver will reset the ink counter.

TABLE 4-5 DETECTION FUNCTION

Detection Function	Description	Availability	Remarks
Paper	Detection with paper end sensor	Available	
Paper delivery	Detection with delivery sensor	Available	
Home position	Detection with home position sensor	Available	
BJ cartridge	Detection with head rank and head temperature sensor	Available	
Ink cartridge		Not available	
Remaining ink	Calculation from dot count and recovery count (Set the function to on/off by function setting)	Available	Default: OFF
BJ cartridge identification	Identification by head ID0 and ID1	Available	
Waste ink absorption	Calculation from dot count and recovery count	Available	
Lithium ion battery	Detection by thermistor inside the battery	Available	

6. SCANNER CARTRIDGE

6.1 Scanner Cartridge Overview

The scanner cartridge is a replaceable scanner unit that carries a one-line 128 pixel BASIS. The scanner separates each of the three RGB primary colors of the LED by scanning the same line three times. The color image is output by 8-bit signals, 256 gradation in each RGB primary color. For a monochrome image, the image is lit with a green LED and scanned once to output either a 8-bit or 2-bit signal. The maximum scanning resolution is 360 dpi × 360 dpi.

The light source LED within the scanner lights up and illuminates the document on the platen. The light rays hit the image and using an imaging lens the reflected light rays are converged onto the BASIS. The converged light rays are converted to analog signals by the BASIS. After the analog signals have been converted to digital signals by the scanner controller, the scanned image is processed and the image data is sent to the computer via the printer's Centronics interface.

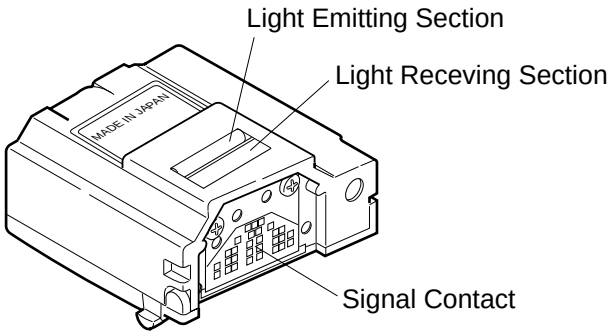


Figure 4-32 Scanner Cartridge

6.1.1 Block diagram

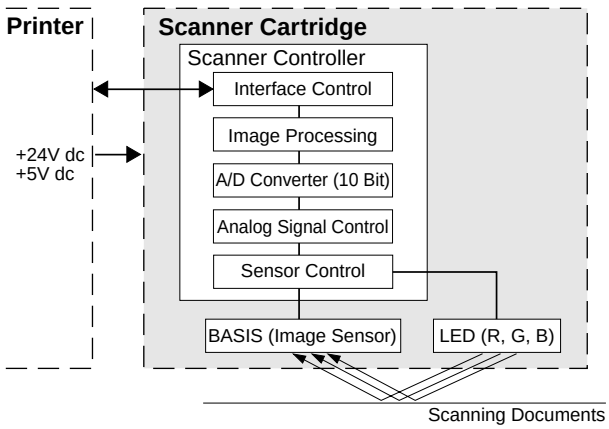


Figure 4-33 Block Diagram

6.2 Scanner Cartridge Structure

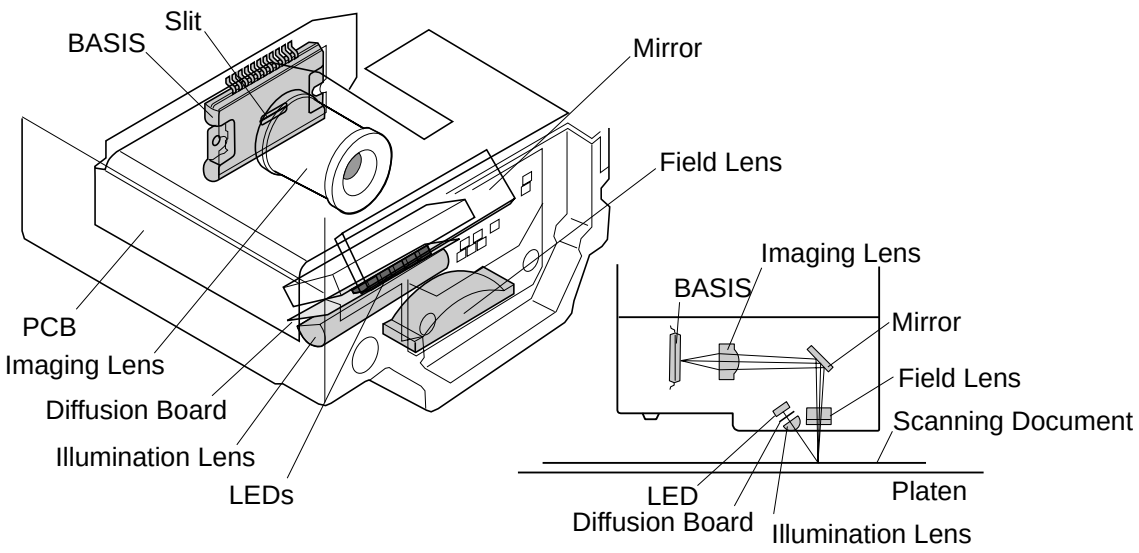


Figure 4-34 Scanner Cartridge

1) LED

Red, green and blue LEDs are used to illuminate the scanning document. To Compensate for the low intensity of the red and green LED's, two red and green LEDs have been incorporated and a total of five LEDs are mounted on the scanner. Only the green LED is used for monochrome scanning.

2) Illumination lens

This "D" shaped lens converges the light from the LED light source.

3) Diffusion board

The light intensity of the LED is brighter at the center than at the ends. The diffusion board allows even distribution of light onto the document.

4) Field lens

This lens prevents any magnification reduction caused by paper gaps when scanning a lifted or bent document.

5) Imaging lens

This lens is used for forming an image of the light rays converged by the field lens onto the BASIS.

6) Shading board

The shading board with a slit at the front surface of the BASIS is used to prevent crosstalk generated in areas adjacent to high contrast areas.

7) BASIS

The scanner cartridge uses a semiconductor type, one-line 128 pixel BASIS (Base-Stored Image Sensor). Depending on the light amount of the image formed on the BASIS, electric voltage signals are sent to the scanner controller as image signals.

8) Scanner controller

The scanner controller is an IC that controls the BASIS and processes the analog signal output from the BASIS. The scanner controller also controls the following image processing:

- Black level Correction
  The black level is set to maximum BASIS output.
- A/D Converter
  The A/D converter converts the image signals to 10 bits image data.
- Shading Correction
  The variation of the image signal is corrected by the shading correction. Due to (i) the variation of the sensivities of the BASIS sensor elements and (ii) the uneven distribution of light transmitted through the center and the periphery of the lenses, the intensity of each scanned line is not uniform. The scanned data is compared against a standard white data to even out and correct the density.
- Carriage Scanning Direction Resolution Converter
  The carriage scanning direction resolution converter converts the resolution of the output in the scanning direction according to the carriage direction.
- Edge emphasis
- Binary image processing function
  The scanner controller has a built-in SRAM used for output buffer memory.

Scanner cartridge cannot be disassembled, reassembled.
As the imaging lens is used for forming an image on the BASIS, it is moved from its fixed position to adjust the optical path for focusing. Focusing cannot be conducted during servicing.

6.3 Signal Contacts

The scanner cartridge is recognized by TOP.S, DIAS and CCHK signals. The scanned image output to the printer is transmitted with a SCLOCK signal in sync with a SDATA signal.

The scanner is controlled by the internal register setting signals, CMD0, 1, 2 and 3.

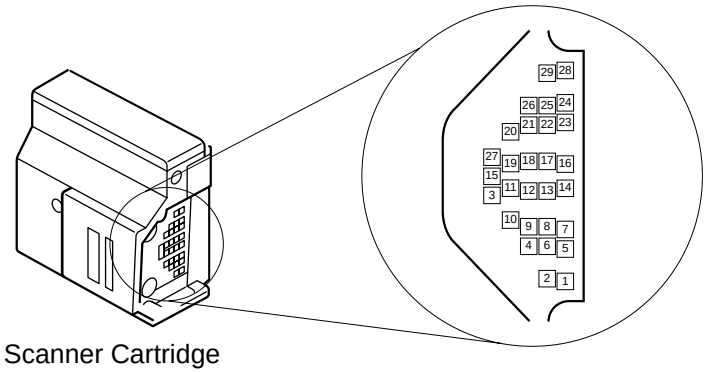


Figure 4-35 Contact Pad Layout

TABLE 4-6 LIST OF SCANNER CARTRIDGE SIGNAL CONTACTS

No.	Signal	Type	Description	(Ref. BJ Cartridge)
1, 2	LAMP G	...	GND for LED	VHG
5, 6	V LAMP	IN	LED drive voltage (+24Vdc)	HVH
9	TOP. S	OUT	Scanner detection GND	TOP
10	C. CHA	OUT	Scanner detection OPEN	DIODEA
11	ID0	OUT	Color scanner cartridge acknowledge signal	ID0
12	ID1	OUT	Color scanner cartridge acknowledge signal	ID1
13	INKS 2	OUT	IS-11/IS-12 detection	—
14	Vss	GND	GND	HVss
19	COM 0 (REN)	IN	Register enable	Odd ENB
20	COM 1 (RWR)	IN	Register write clock signal	BENB1
21	COM 2 (RDT)	IN	Register data signal	BENB2
22	COM 3 (N.C)	...	Not used	BENB3
23	Vdd	...	IC driver voltage (+5Vdc)	HVdd
24	S CLOCK (DTCK)	OUT	Scan data transfer signal	HCLK
25	S SYNE (LNST)	IN	Line start signal	HLATCH
26	S RES	IN	System reset signal	HRES
28	S DATA (DT)	OUT	Scan data	HDATA
29	C. CHK	OUT	HScanner detection OPEN	DIODEK

6.4 Scan Mode

TABLE 4-7 LIST OF SCAN MODE

Scanning Resolution (dpi)	Scanning Image Pixel Width			Carriage Speed
	Color	Black & White		
	Multi Value	Multi Value	Binary	
360 × 360	48 dots	48 dots	128 dots	3.91 KHz
300 × 360	64 dots	64 dots	128 dots	3.91 KHz
200 × 360	64 dots	112 dots	128 dots	3.91 KHz
200 × 180	64 dots	128 dots	128 dots	6.43 KHz
180 × 180	64 dots	128 dots	128 dots	6.43 KHz
90 × 90	64 dots	128 dots	128 dots	7.81 KHz

6.5 Calibration

The process of sampling and collecting data such as the printer's internal temperature, black standard data and white standard data is referred to as calibration.
The scanner application retains the past 5 calibration data and saves them in a file. When a scanning operation is performed, a value from the compiled temperature data that is within ±5°C of the printer's internal temperature at the time is downloaded to the scanner controller. The scanner application requests calibration when there is no compiled data within ±5°C.

Part 5

MAINTENANCE

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5 - 1	1.1 Periodically-replaced Parts
5 - 1	1.2 Consumables
5 - 1	1.3 Periodic Maintenance
5 - 2	2. SERVICE TOOLS
5 - 2	2.1 List of Tools
5 - 3	3. APPLYING THE GREASE
5 - 4	4. ADJUSTMENT
5 - 5	5. TROUBLESHOOTING
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5 - 7	5.2 Error Condition Diagnosis
5 -31	6. CONNECTOR POSITION & PIN ALIGNMENT
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1. MAINTENANCE

1.1 Periodically-replaced Parts

Level	Periodically-replaced parts
User	None
Service engineer	None

1.2 Consumables

Level	Consumables	
User	Black BJ cartridge	BC-10
	Color BJ cartridge	BC-11e
	Ink cartridge	BCI-10 Black
		BCI-11 Black
		BCI-11 Color
	Lithium ion battery	LB-50
Service engineer	None	

1.3 Periodic Maintenance

Level	Periodic Maintenance
User	None
Service engineer	None

2. SERVICE TOOLS

2.1 List of Tools

General tool	Use
Phillips screwdriver	For removing screws (M2.6)
Flathead screwdriver	For removing plastic parts
Multi Mater	For troubleshooting
Tweezers	For fitting and removing flexible cables

Special tool	Use
Grease (CK-0562-000)	MOLYKOTE PG-641

3. APPLYING THE GREASE

The points to grease with a special tool are shown below.
Apply a thin coat of grease to the specified points. See the Part Catalog for details of the printer disassembling and reassembling procedures.

CAUTION

Take special care not to apply grease to the wiper or the cap when greasing the guide shaft.

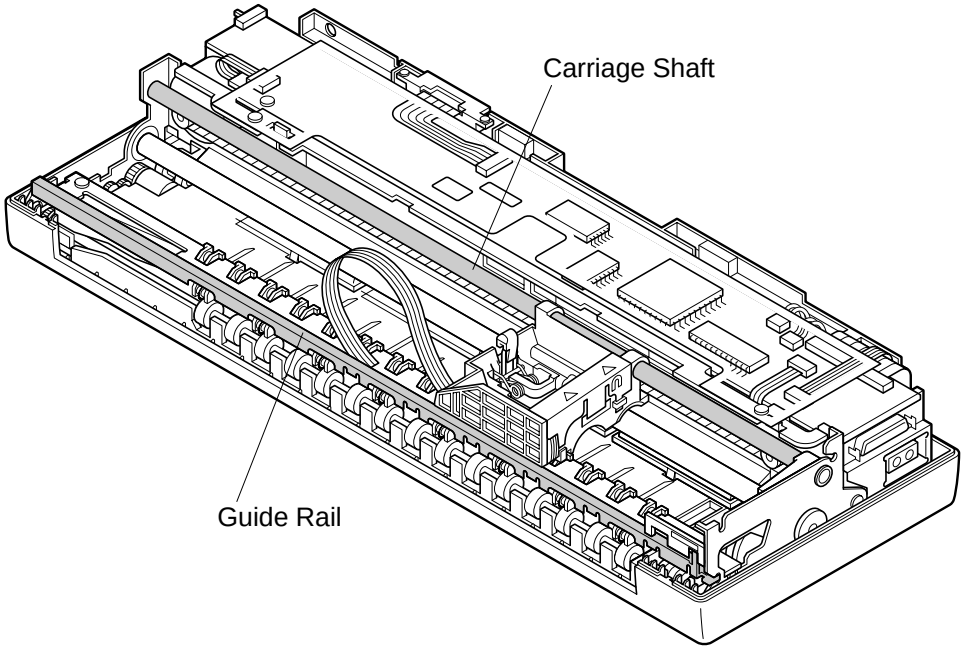


Figure 5-1 Grease Application Sections

4. ADJUSTMENT

No parts need to be adjusted.

5. TROUBLESHOOTING

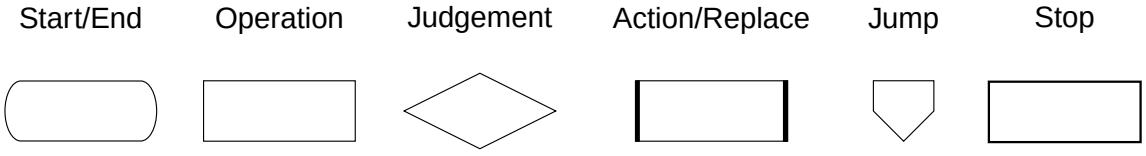
5.1 Overview of Troubleshooting

5.1.1 Definition

Troubleshooting consists of error condition diagnosis, which is required if the cause of an error is unknown, and error recovery, which is performed if the cause of an error is known. If the cause of an error is unknown, perform the error condition diagnosis, and if it is known, perform error recovery.

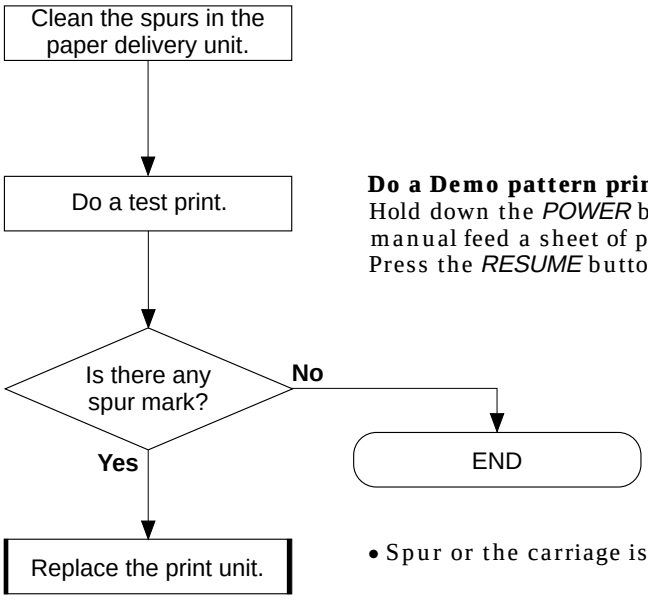
5.1.2 Precautions for troubleshooting

1. Before starting error condition diagnosis, make sure all the connectors and ribbon cables are plugged in.
2. If you repair the printer with its case removed and the Universal adapter or battery pack installed, take utmost care to prevent electric shock from the power supply unit and PCB shorting.
3. Troubleshooting procedures are given in flowcharts. The following symbols are used in the flowcharts:



4. After replacement or repair, do a test print to make sure the printer works properly. If the printer does not work properly, perform troubleshooting again, skipping the steps that were done before.

Example 1



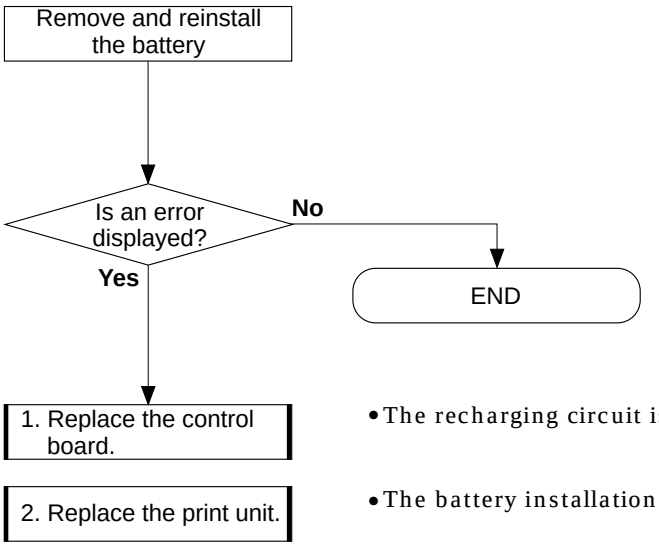
Do a Demo pattern print.
Hold down the *POWER* button until the beeper sounds once and manual feed a sheet of paper.
Press the *RESUME* button to start Demo pattern print.

• Spur or the carriage is defective.

5. Several measures may be described in the error condition diagnosis and error recovery.
   They are shown in each step to be done to solve the problem.
   Do a test print after completing each step to make sure the problem has been eliminated. If it persists, go to the next step.

Example 2

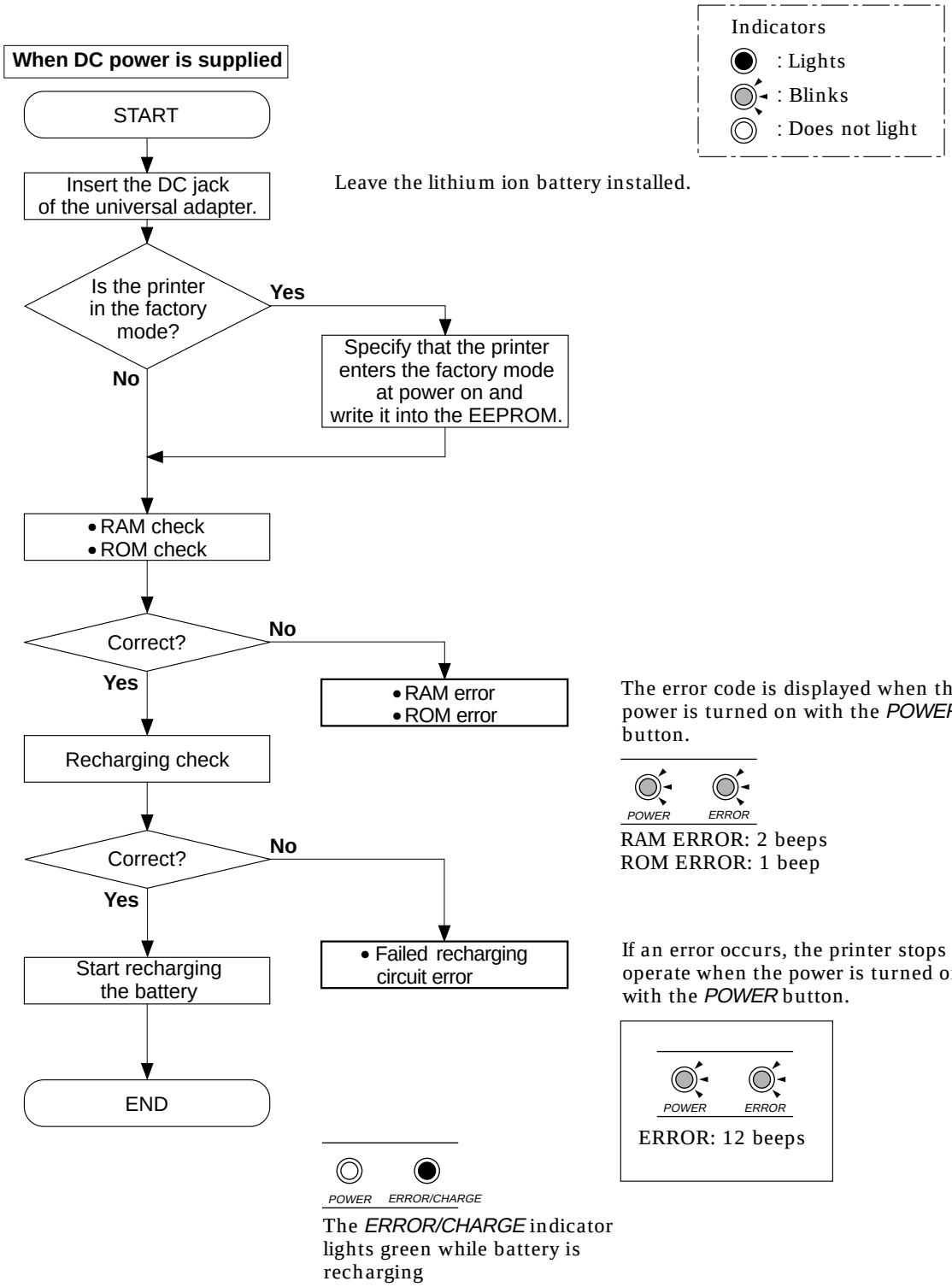
After replacing the control board in step 1, carry out a test print to make sure the problem has been solved.
If it still persists, go to step 2 and replace the print unit.

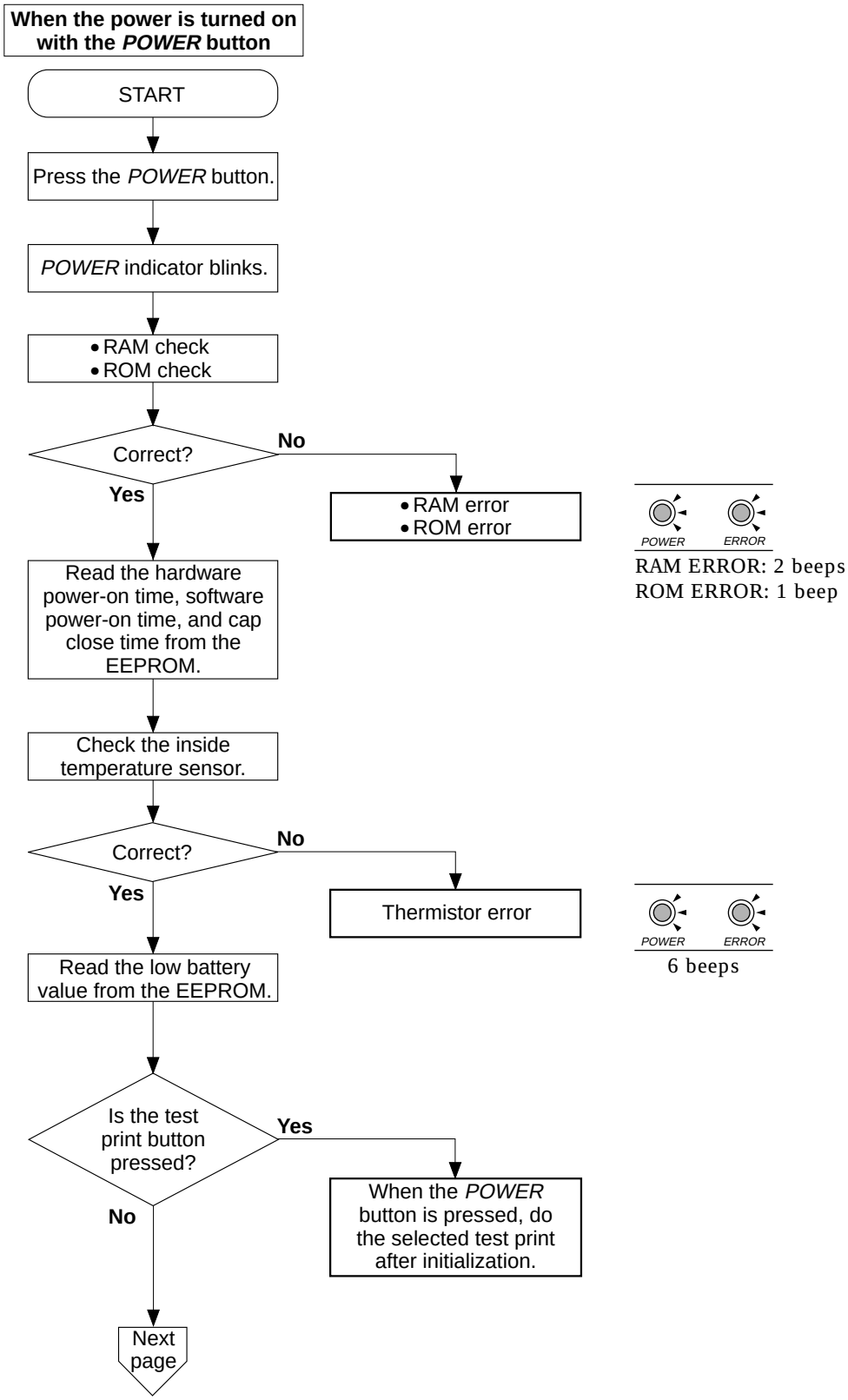


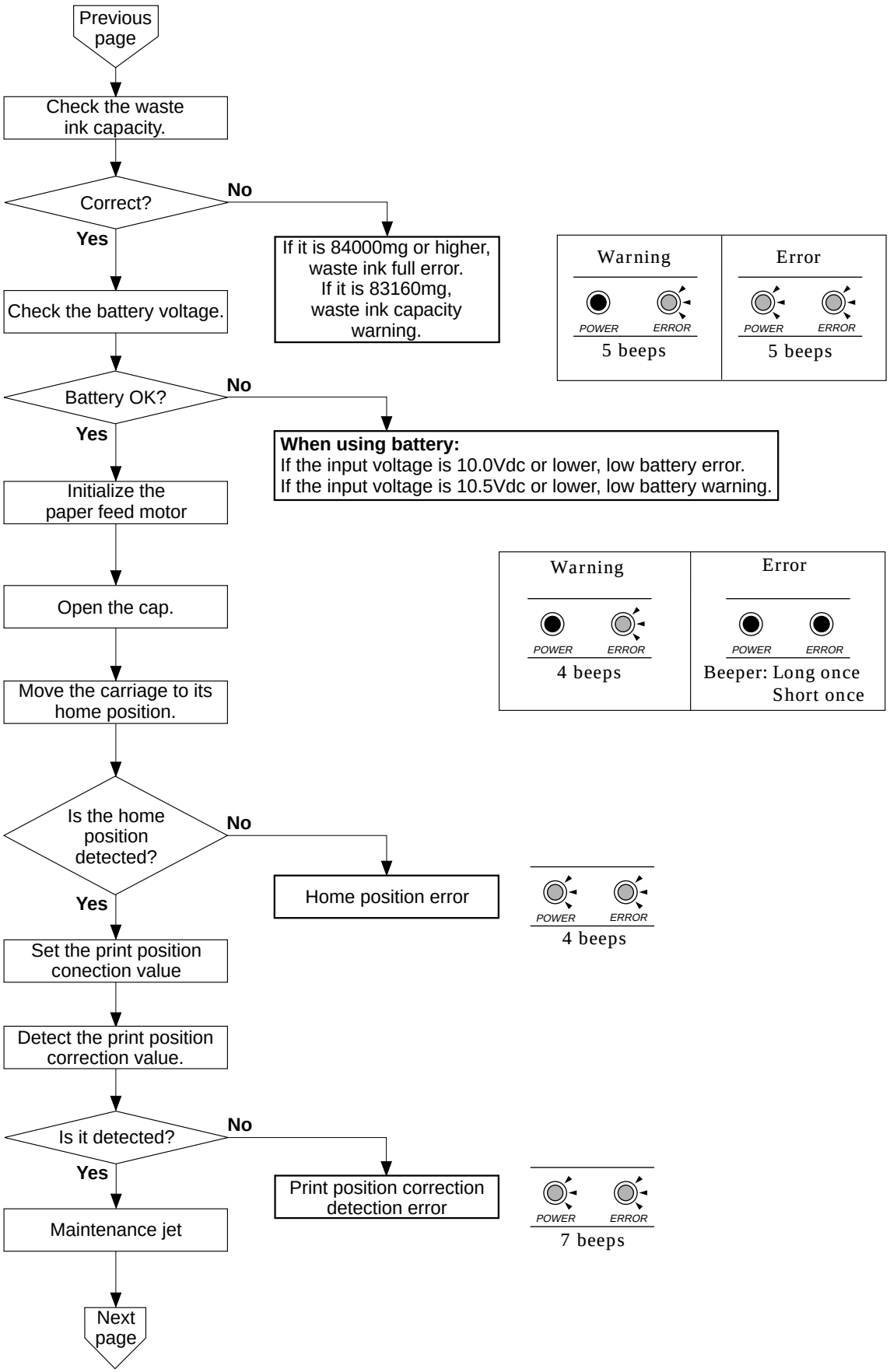
6. After troubleshooting, make sure that all the connectors have been plugged back in correctly and that all the screws are tight.

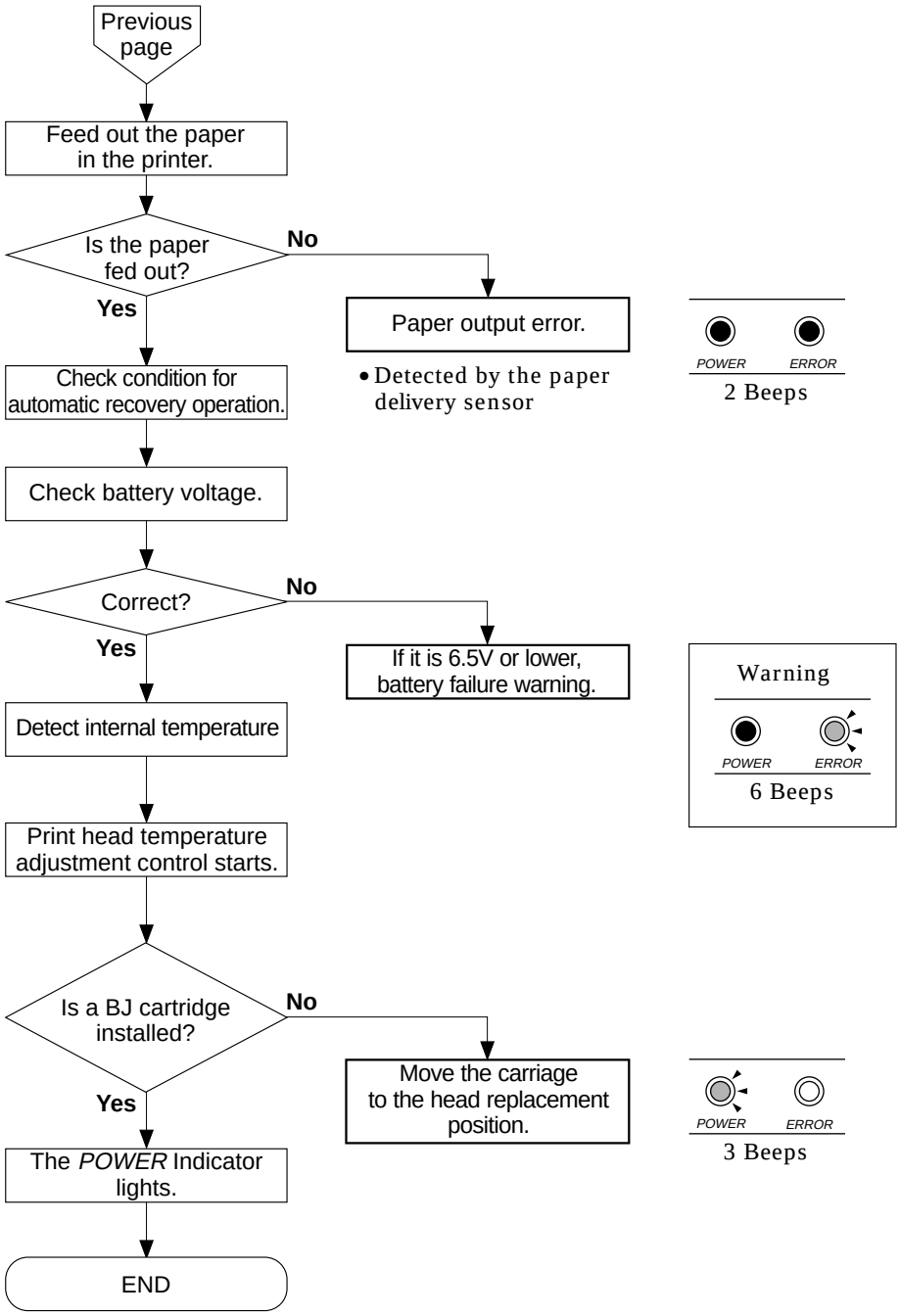
When replacing the control board, check the quantity of waste ink absorbed in the waste ink absorber in the printer base unit, and reset the quantity of waste ink absorbed in the EEPROM. See *Part 3: 3.6 EEPROM Data Setting (page 3-23)*.

5.2 Error Condition Diagnosis
5.2.1 Diagnosis flowchart




When the power is turned on with the POWER button
START
Press the POWER button.
POWER indicator blinks.
• RAM check
• ROM check
Correct?
No
Yes
• RAM error
• ROM error
POWER
ERROR
RAM ERROR: 2 beeps
ROM ERROR: 1 beep
Read the hardware power-on time, software power-on time, and cap close time from the EEPROM.
Check the inside temperature sensor.
Correct?
No
Yes
Thermistor error
POWER
ERROR
6 beeps
Read the low battery value from the EEPROM.
Is the test print button pressed?
Yes
No
When the POWER button is pressed, do the selected test print after initialization.
Next page


Previous page
Check the waste ink capacity.
Correct?
No
Yes
If it is 84000mg or higher, waste ink full error.
If it is 83160mg, waste ink capacity warning.
Warning
POWER
ERROR
5 beeps
Error
POWER
ERROR
5 beeps
Check the battery voltage.
Battery OK?
No
Yes
When using battery:
If the input voltage is 10.0Vdc or lower, low battery error.
If the input voltage is 10.5Vdc or lower, low battery warning.
Initialize the paper feed motor
Open the cap.
Move the carriage to its home position.
Warning
POWER
ERROR
4 beeps
Error
POWER
ERROR
Beeper: Long once
Short once
Is the home position detected?
No
Yes
Home position error
POWER
ERROR
4 beeps
Set the print position conection value
Detect the print position correction value.
Is it detected?
No
Yes
Print position correction detection error
POWER
ERROR
7 beeps
Maintenance jet
Next page


Previous page
Feed out the paper in the printer.
Is the paper fed out?
No
Yes
Paper output error.
• Detected by the paper delivery sensor
POWER
ERROR
2 Beeps
Check condition for automatic recovery operation.
Check battery voltage.
Correct?
No
Yes
If it is 6.5V or lower, battery failure warning.
Warning
POWER
ERROR
6 Beeps
Detect internal temperature
Print head temperature adjustment control starts.
Is a BJ cartridge installed?
No
Yes
Move the carriage to the head replacement position.
POWER
ERROR
3 Beeps
The POWER Indicator lights.
END

5.2.2 Error recovery

a) Error display

1. ROM Error	**<Cause>** During initialization, the content in ROM cannot be read. **<Suspected parts>** Flash ROM/FONT ROM **<Measure>** Replace control board.
2. RAM Error	**<Cause>** RAM reading and writing cannot be done properly. **<Suspected parts>** DRAM **<Measure>** Replace control board.
3. EEPROM Error	**<Cause>** EEPROM reading and writing cannot be done properly. **<Suspected parts>** EEPROM **<Measure>** Replace control board.

When a ROM or RAM error occurs, the correct error may not be displayed. When replacing the control board, check the amount of waste ink absorbed by the waste ink absorber and reset the EEPROM in the printer base unit.

See *Part 3: 3.6 EEPROM Data Setting (page 3-23)*.

4. Home Position Sensor Error

<Cause> The home position sensor cannot detect the carriage.
<Suspected part> Home position sensor, carriage motor, paper feed motor, control board

<Measure>

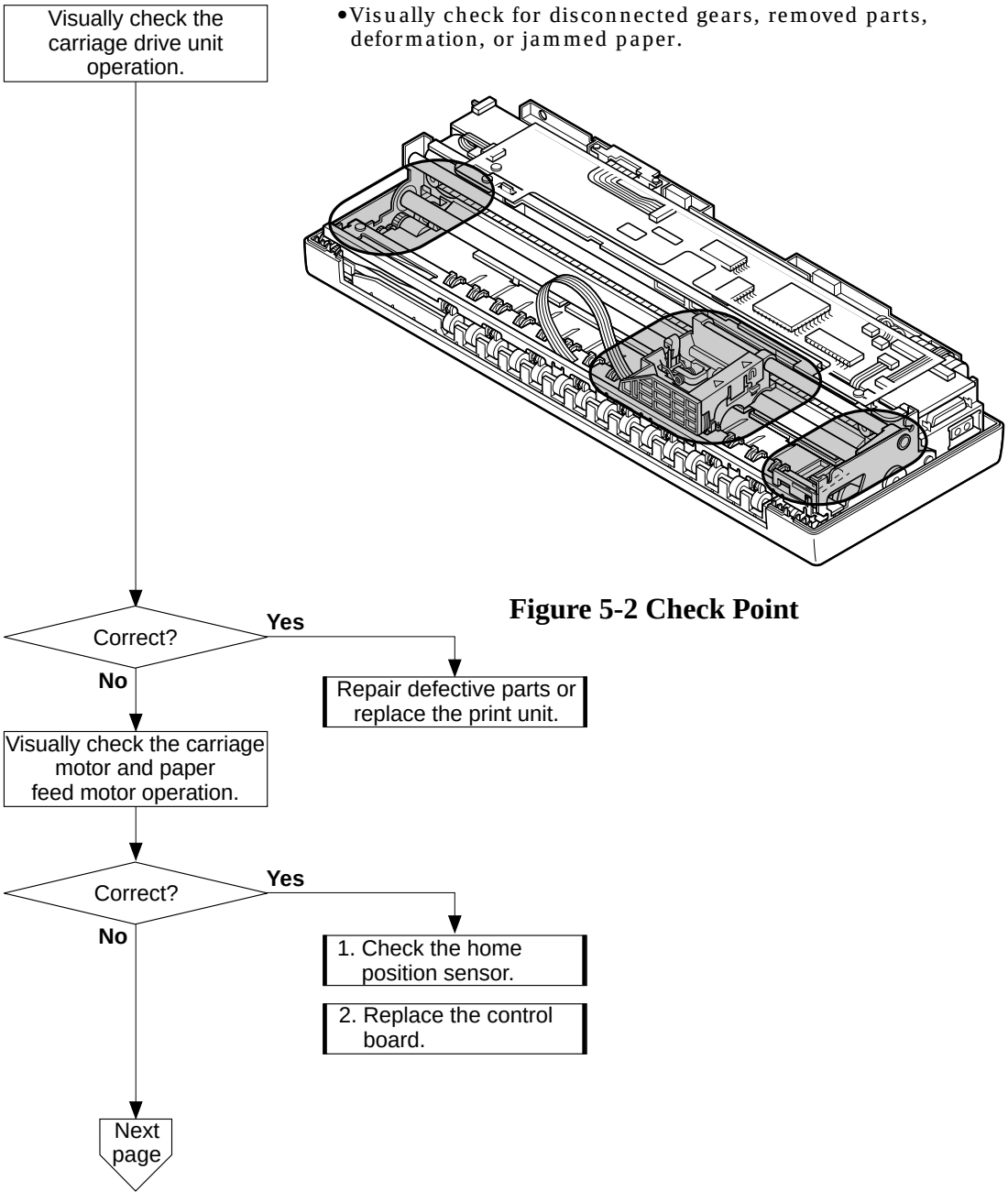
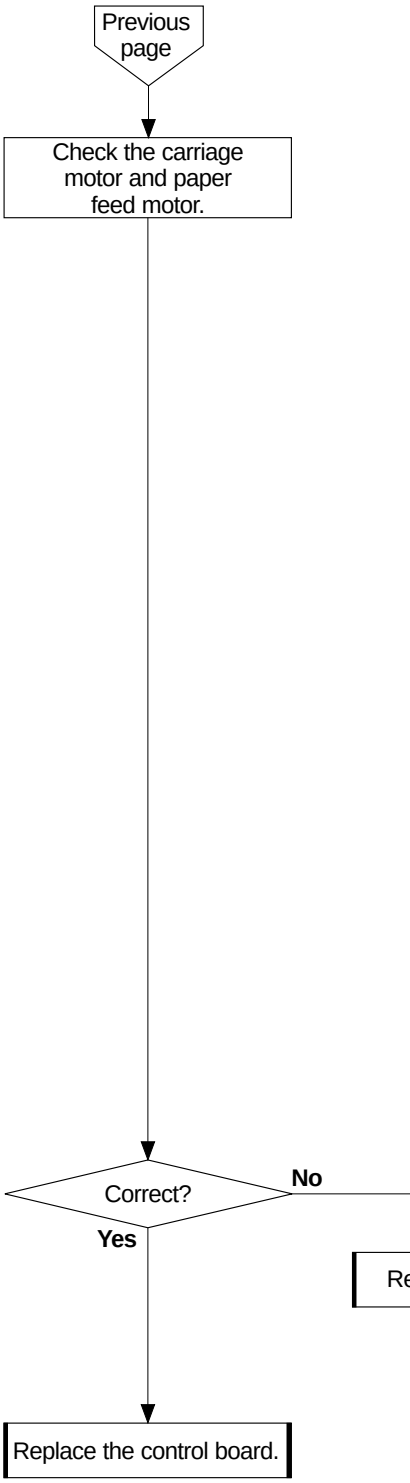

Visually check the carriage drive unit operation.
•Visually check for disconnected gears, removed parts, deformation, or jammed paper.
Correct?
Yes
No
Repair defective parts or replace the print unit.
Visually check the carriage motor and paper feed motor operation.
Correct?
Yes
No
1. Check the home position sensor.
2. Replace the control board.
Next page

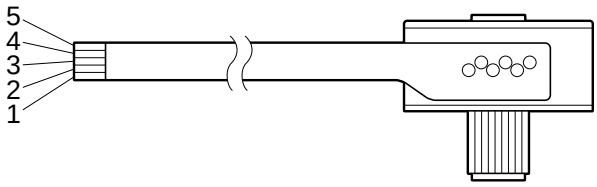
Figure 5-2 Check Point

CAUTION

When replacing the control board, check the quantity of waste ink absorbed in the waste ink absorber in the printer base unit, and reset the quantity of waste ink absorbed in the EEPROM.
See *Part 3: 3.6 EEPROM Data Setting (page 3-23)*.



Carriage Motor

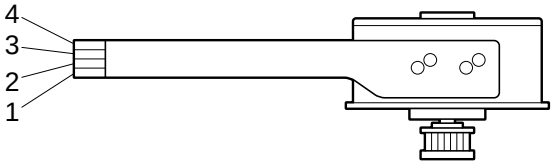


Meter connection		Reading
CNLR Pin No	1-2	Approx. 8.3 Ω
	3-4	

- Disconnect the carriage motor connector from the control board before check.

Figure 5-3 Carriage Motor

Paper Feed Motor



Meter connection		Reading
CNLF Pin No.	2-5	Approx. 70Ω
	3-4	

- Disconnect the carriage motor connector from the control board before check.

Figure 5-4 Paper Feed Motor

- The carriage motor or paper feed motor is defective.

When replacing the control board, check the quantity of waste ink absorbed in the waste ink absorber in the printer base unit, and reset the quantity of waste ink absorbed in the EEPROM. See *Part 3: 3.6 EEPROM Data Setting (page 3-23)*.

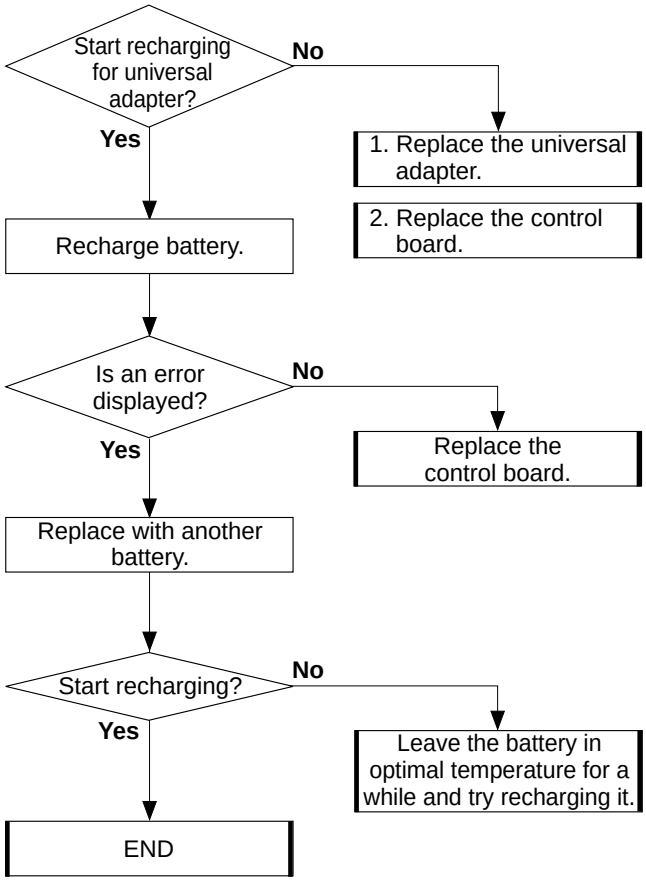
5. Print Position Correction Detection Error

<Cause> Print position correction cannot be detected properly.
<Suspected part> Carriage motor, control board,home position sensor
<Measure> Same as when the home position sensor error is displayed.

6. Low Battery Error

<Cause> The voltage of the lithium ion battery is incorrect. (10.0Vdc or lower)
<Suspected part> Lithium ion battery, Universal adapter, Control board

<Measure>



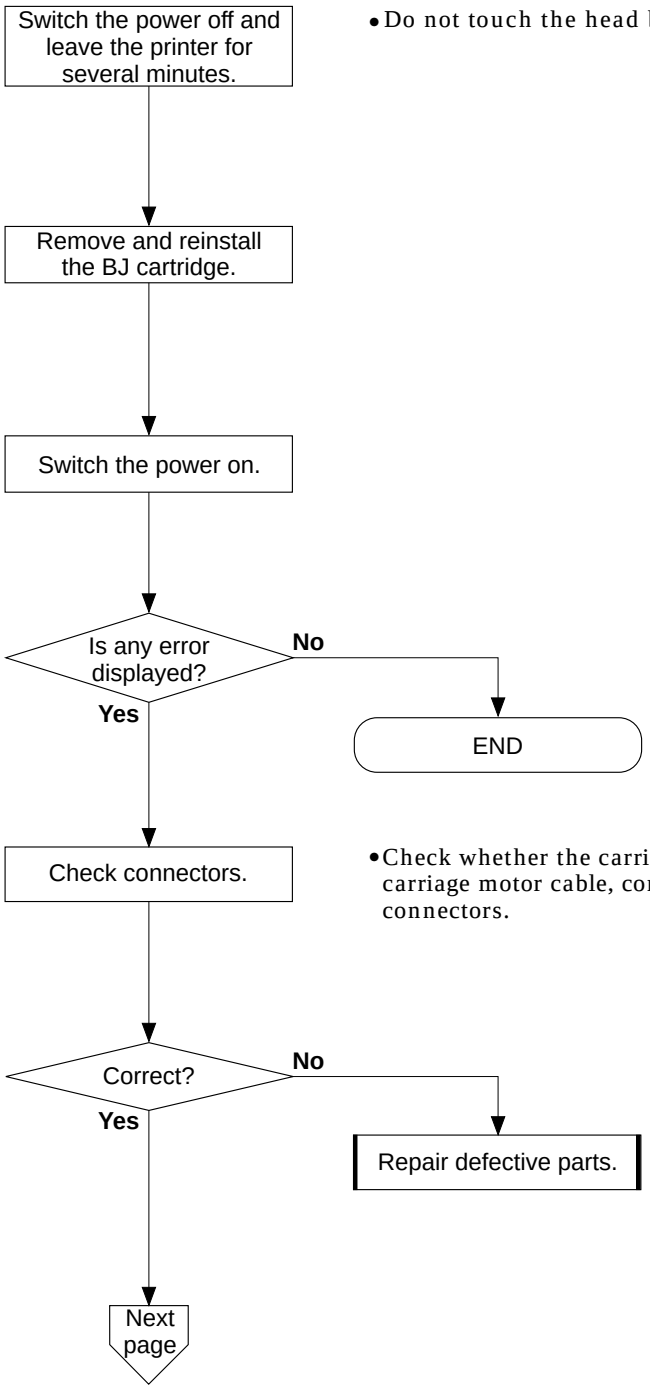
7. Thermistor Error

<Cause> The thermistor is faulty.
<Suspected part> Thermistor
<Measure> Replace the control board.

8. Head Temperature Error

<Cause> The head temperature has risen excessively.
<Suspected part> BJ head or control board

<Measure>

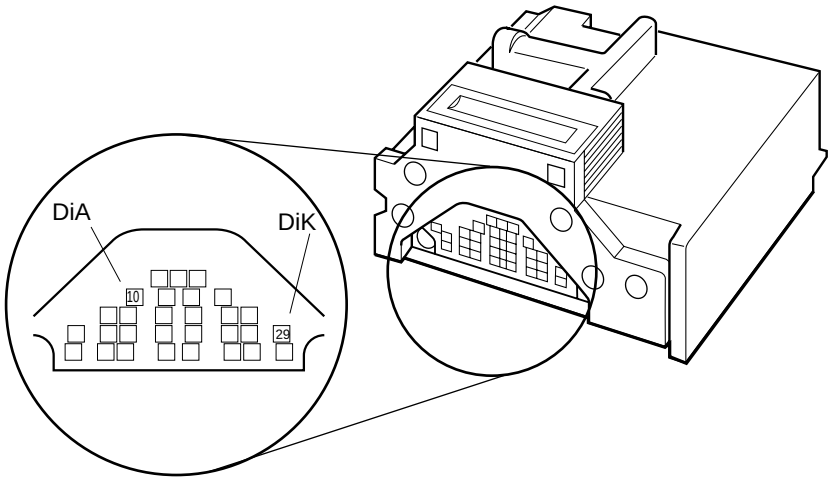


- Do not touch the head because it can be too hot.

- Check whether the carriage ribbon cable, paper feed motor cable, carriage motor cable, control board cable are plugged in the connectors.

Previous page

Check the BJ head temperature sensor resistance.



Meter connection			Reading
	+	–	
Pin No.	10	29	Conductivity
	29	10	No conductivity

The black BJ cartridge and the color BJ cartridge have the same meter connections and meter readings.

Figure 5-5 BJ Head Temperature Sensor

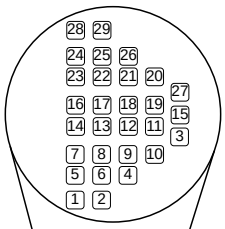
Correct?

No

Replace the BJ cartridge.

Yes

Check the carriage ribbon cable.



• Check the conductivity of Pins 10, 29 and 11.

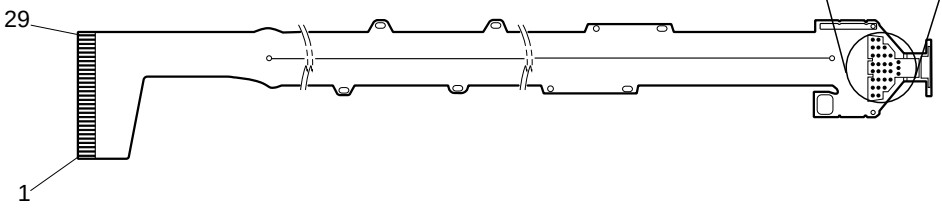


Figure 5-6 Carriage Ribbon Cable

Correct?

No

Replace the print unit.

•The carriage ribbon cable is defective.

Yes

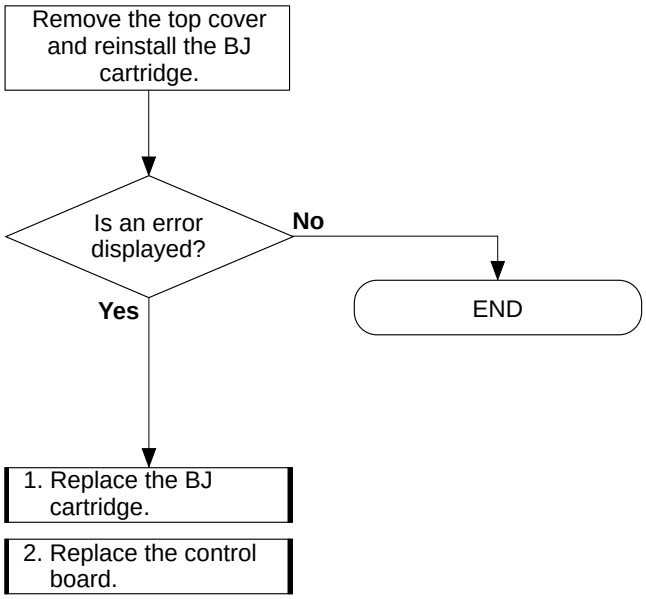
Replace the control board.

9. No Head Error

<Cause> The BJ cartridge is removed from a position other than the BJ cartridge removal position.

<Suspected part> BJ cartridge or control board

<Measure>

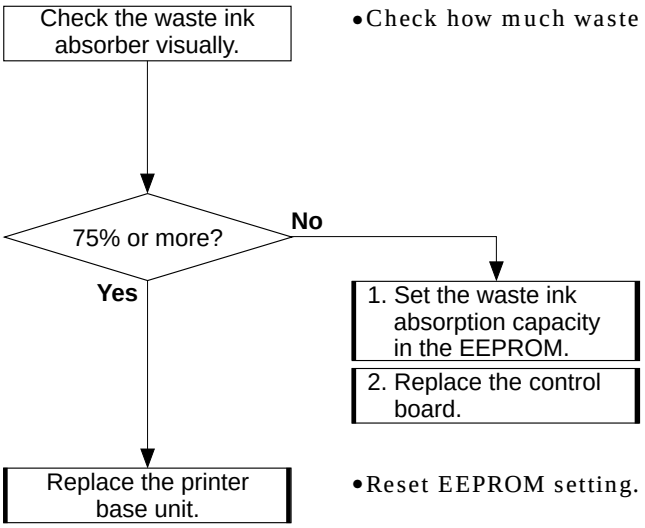


10. Waste Ink Full Error

<Cause> The capacity of waste ink absorbed into the waste ink absorber reaches 100%.

<Suspected part> Waste ink absorber or control board

<Measure>


Check the waste ink absorber visually.
75% or more?
No
Yes
1. Set the waste ink absorption capacity in the EEPROM.
2. Replace the control board.
Replace the printer base unit.

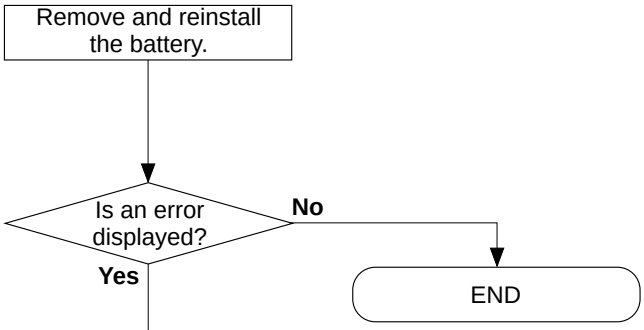
- Check how much waste ink is contained in the waste ink absorber.
- See *Part 3: 3.6 EEPROM Data Setting.*
- Reset EEPROM setting.

11. Failed Recharging Circuit Error

<Cause> The recharge current exceeds the standard value.

<Suspected part>
- Control board.
- The contact points between the lithium ion battery and the printer.

<Measure>



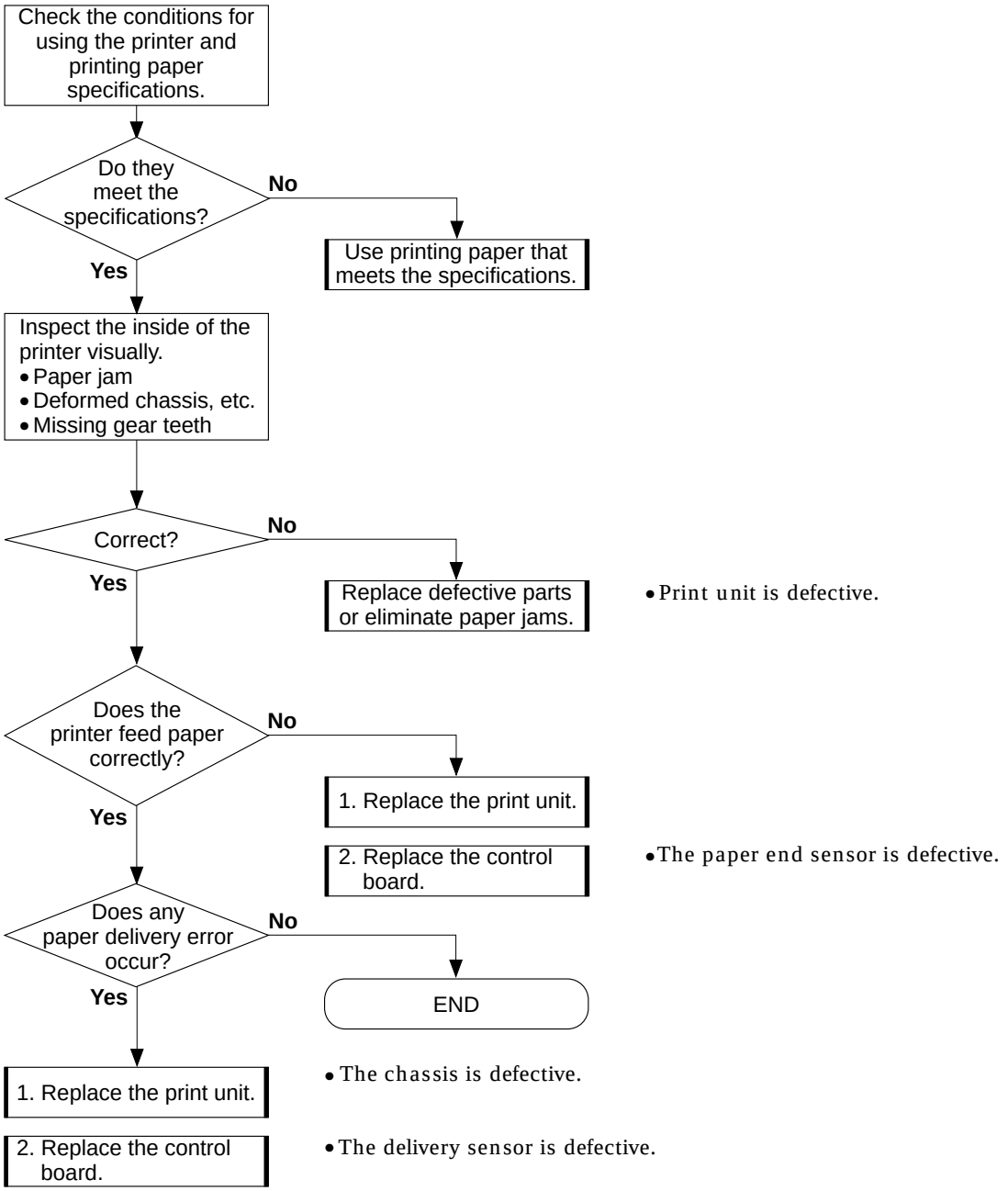
1. Replace the control board.
   - The recharging circuit is defective.
2. Replace the print unit.
   - The battery installation part is defective.

12. Paper Feed /Delivery Error

<Symptom>
- Paper cannot be fed. More than one sheet is fed at a time.
- Paper is not loaded horizontaly. Paper is not output.

<Cause>
The paper end sensor is defective.
The paper feed roller does not work correctly.
The paper delivery roller does not work correctly.
Paper jam.
The paper delivery sensor is defective.

<Measure>

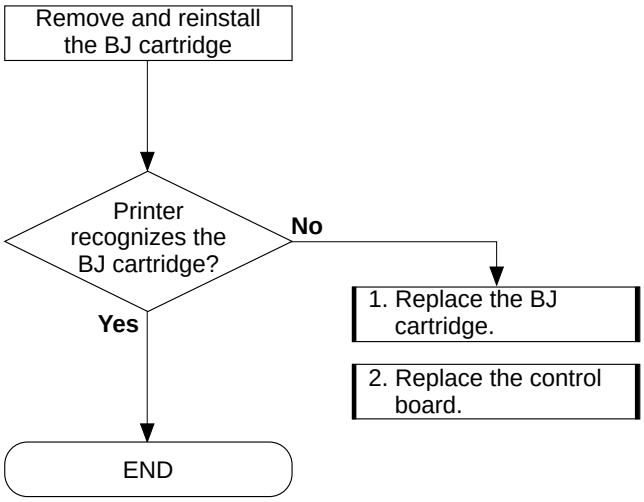

Check the conditions for using the printer and printing paper specifications.
Do they meet the specifications?
No
Use printing paper that meets the specifications.
Yes
Inspect the inside of the printer visually.
• Paper jam
• Deformed chassis, etc.
• Missing gear teeth
Correct?
No
Yes
Replace defective parts or eliminate paper jams.
• Print unit is defective.
Does the printer feed paper correctly?
No
Yes
1. Replace the print unit.
2. Replace the control board.
• The paper end sensor is defective.
Does any paper delivery error occur?
No
Yes
END
1. Replace the print unit.
• The chassis is defective.
2. Replace the control board.
• The delivery sensor is defective.

13. BJ Cartridge Check Error

<Cause> This error appears when the carriage is returned to the home position without the BJ cartridge installed,or when presence of BJ cartridge is not recognized though it is installed.

<Suspected part> Faulty contact between the BJ cartridge and carriage
Faulty BJ cartridge
Faulty carriage ribbon cable
Faulty control board

<Measure>



14. Cartridge Mismatch Error

<Cause> The BJ cartridge is not recognized correctly.
The printer is set at scanner mode but the BJ cartridge is not installed.

<Suspected part> Connection between the BJ cartridge and the carriage
BJ cartridge
Scanner cartridge
Carriage ribbon cable
Control board

<Measure> • Replace the BJ cartridge.
• Replace the scanner cartridge.

15. No Battery Error

<Cause> The lithium ion battery is not installed.

<Suspected part> Lithium ion battery.
Connection between the printer and the lithium ion battery.
Control board.

<Measure> • The lithium ion battery is installed.
• Replace the lithium ion battery.

16. Failed Manual Feeding warning

<Cause> The manual fed cut sheet is not inserted far enough into the printer for the paper feed roller to grab it.
The paper end sensor detects the sheet but it is not fed into the printer.

<Suspected part> Paper end sensor

<Measure>
- Pull out the sheet from the paper feeding slot.

17. Failed Battery Warning

<Cause> The lithium ion battery voltage is less than 6.5V and it is not recovered by recharging.
The recharging current is less than 40mA.

<Suspected part> Lithium ion battery
Control board

<Measure>
- Remove the faulty battery and replace it with either a new or recharged battery.
- Replace the control board.

18. Waste Ink Capacity Warning

<Cause> When the power is turned on or when recovery operation completes, the remaining capacity of the absorber is 840mg.

<Suspected part> Waste ink absorber

<Measure>
- Press the *RESUME* button to recover.
- If the capacity of waste ink in the waste ink absorber reaches 84000mg or higher, a waste ink error occurs.
- Replace the printer base unit.

19. Low Battery Warning

<Cause> This warning appears when the voltage in the lithium ion battery is less than 10.5V.

<Suspected part> Lithium ion battery

<Measure>
- It can be recovered by pressing *RESUME* button within five minutes after the warning is displayed
- If the voltage is not restored within five minutes after the warning is issued, the printer turns off automatically.
- Recharge the lithium ion battery.

20. Cartridge Replacement Compulsory Completion Warning

<Cause> This error appears when the carriage is left for five minutes at replacement positiion and the carriage is compursoly returned to the home position.

<Suspected part> The BJ cartridge is in the replacement mode for five minutes or longer.

<Measure>
- Press the *RESUME* button to recover.
- Press the *CARTRIDGE* button again and replace the cartridge.

21. Ink Low Warning

The ink low warning is displayed when the ink low warning function is enabled in the exclusive printer driver.

<Cause> Remaining ink in the ink tank is decreasing.
The ink consumption calculated from the numbers of dots, maintenance jets, and cleanings exceeds the maximum ink consumption value, the beeper sounds twice, the *POWER* indicator lights and the *ERROR* indicator blinks.

<Suspected part> Ink cartridge (Out of ink)

<Measure>
- Press the *CARTRIDGE* button to enter the replacement mode. After the beeper sounds once, the *ERROR* indicator will blink. Determine which ink tank is low by the blinking cycles.
  - BCI-10/BCI-11 Bk: One cycle
  - BCI-11 Color: Two cycles
  - BCI-11 Color/Bk: Three cycles
- After replacing the ink tank, reset the ink counter by selecting the ink replacement mode in the host computer.
- The printer can be used with the warning displayed even without having replaced the ink tank.

The ink low resetting/canceling is effective only when the BJ cartridge is installed.

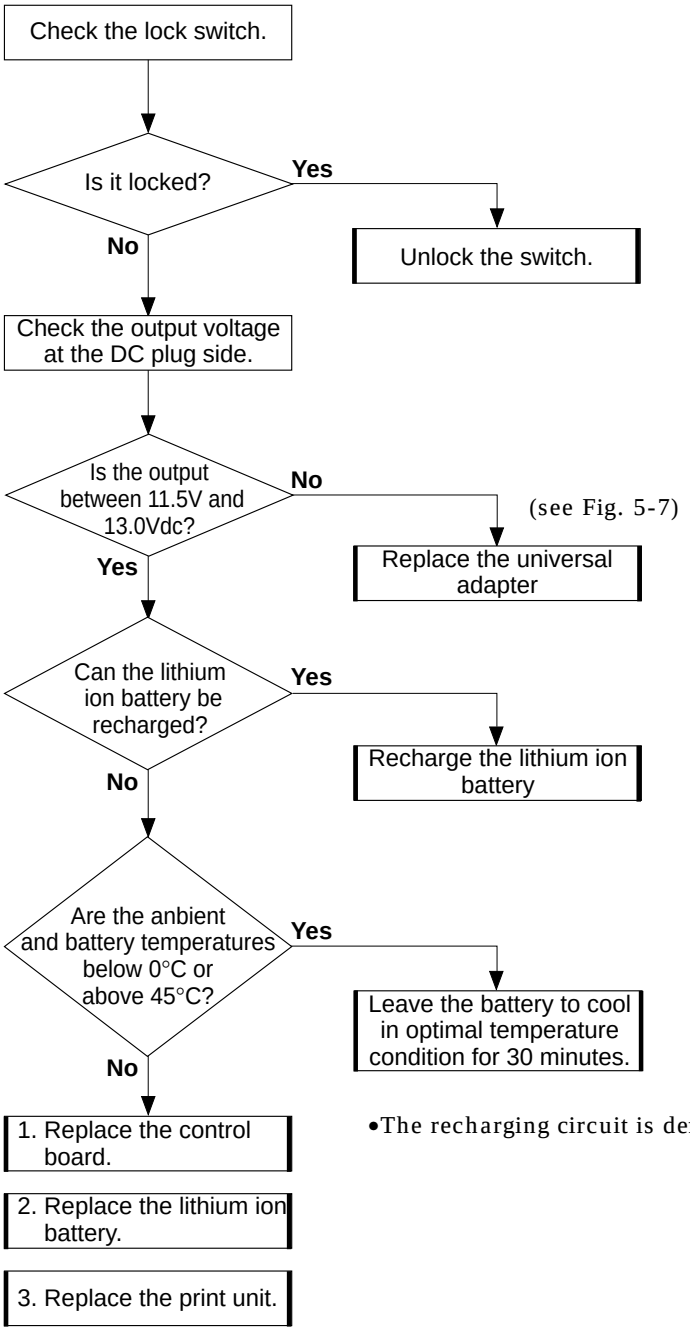
b) Symptoms

1. The Power Does Not Turn On.

<Symptom>
- When the *POWER* button is pressed, the printer does not turn on.
- When *POWER* button is pressed, the printer does not start initialization.

<Cause> The universal adapter, lithium ion battery or control board.

<Measure>


Check the lock switch.
Is it locked?
Yes
Unlock the switch.
No
Check the output voltage at the DC plug side.
Is the output between 11.5V and 13.0Vdc?
No
(see Fig. 5-7)
Replace the universal adapter
Yes
Can the lithium ion battery be recharged?
Yes
Recharge the lithium ion battery
No
Are the anbient and battery temperatures below 0°C or above 45°C?
Yes
Leave the battery to cool in optimal temperature condition for 30 minutes.
No
1. Replace the control board.
2. Replace the lithium ion battery.
3. Replace the print unit.

•The recharging circuit is defective.

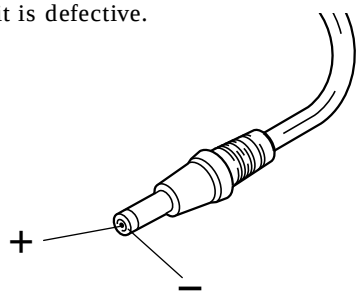


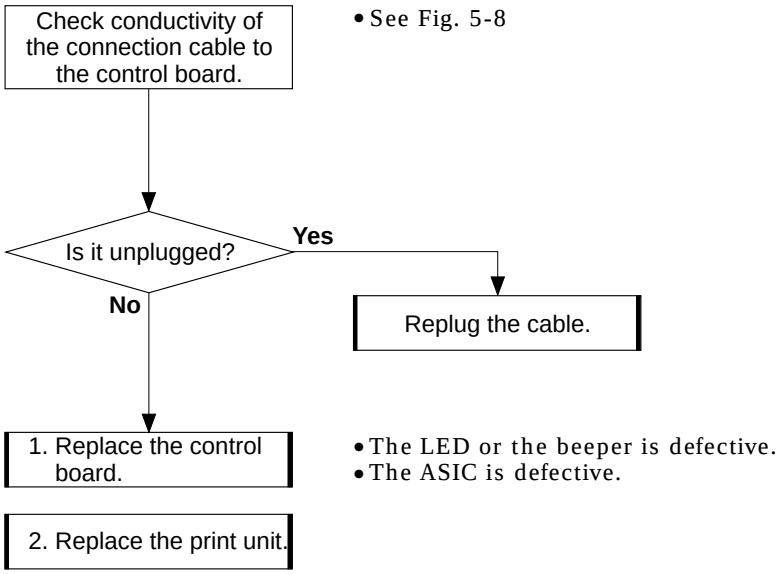
Figure 5-7 DC Plug

2. Control Panel Failure

<Symptom>
- LED does not light.
- The buzzer does not sound.
  Test printing cannot be done.
- Operation buttons are ineffective.

<Cause> The LED or the beeper is defective.
Buttons are defective.
Flexible cables are defective.
The control board is defective.

<Measure>


Check conductivity of the connection cable to the control board.
See Fig. 5-8
Is it unplugged?
Yes
No
Replug the cable.
1. Replace the control board.
The LED or the beeper is defective.
The ASIC is defective.
2. Replace the print unit.

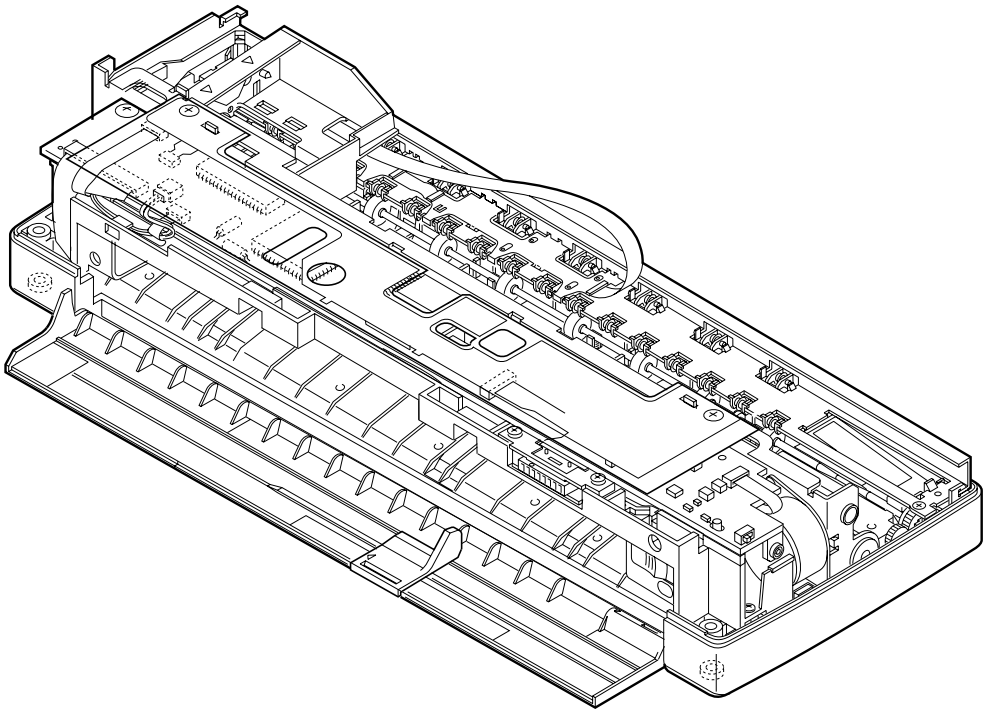


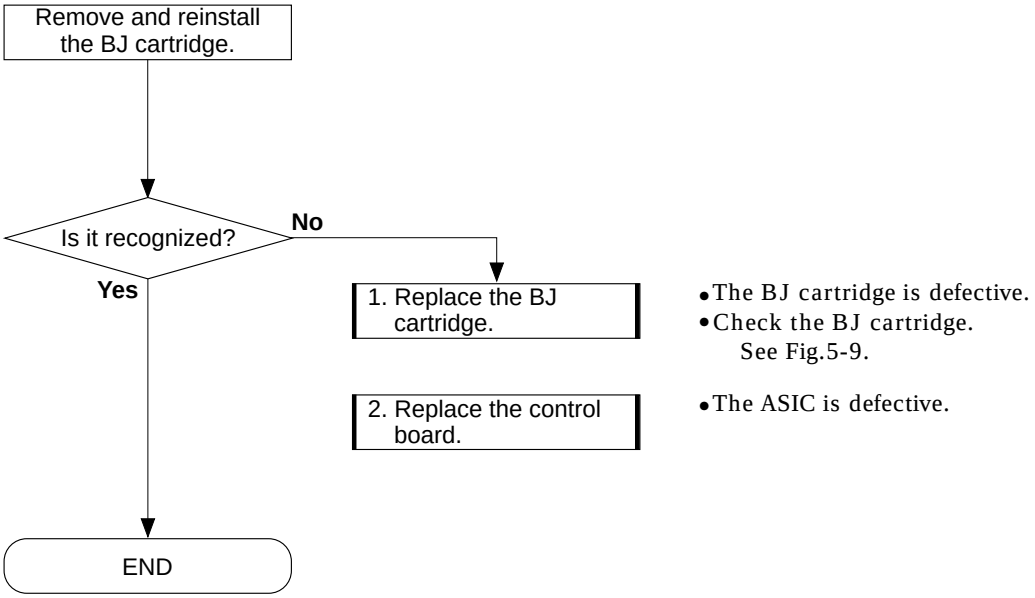
Figure 5-8 Flexible Cables

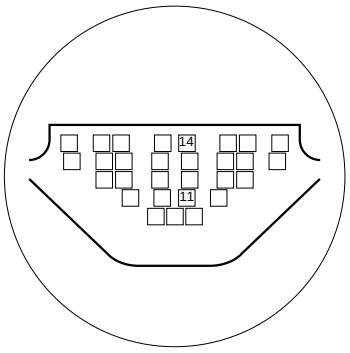
3. BJ Cartridge is Not Recognazed.

<Symptom>
- The installed BJ cartridge is not recognized.
- When the BJ cartridge is installed, the carriage returns to the replacement position.
- The installed BJ cartridge is not recognized correctly.

<Cause> The BJ cartridge does not contact the carriage properly.
The BJ cartridge is defective.
The carriage is defective.
The control board is defective.

<Measure>


Remove and reinstall the BJ cartridge.
Is it recognized?
No
Yes
1. Replace the BJ cartridge.
• The BJ cartridge is defective.
• Check the BJ cartridge. See Fig.5-9.
2. Replace the control board.
• The ASIC is defective.
END



Meter connection			Reading	
Pin No.	11	14	Approx. 0 Ω	BC-10
	11	14	∞	BC-11e

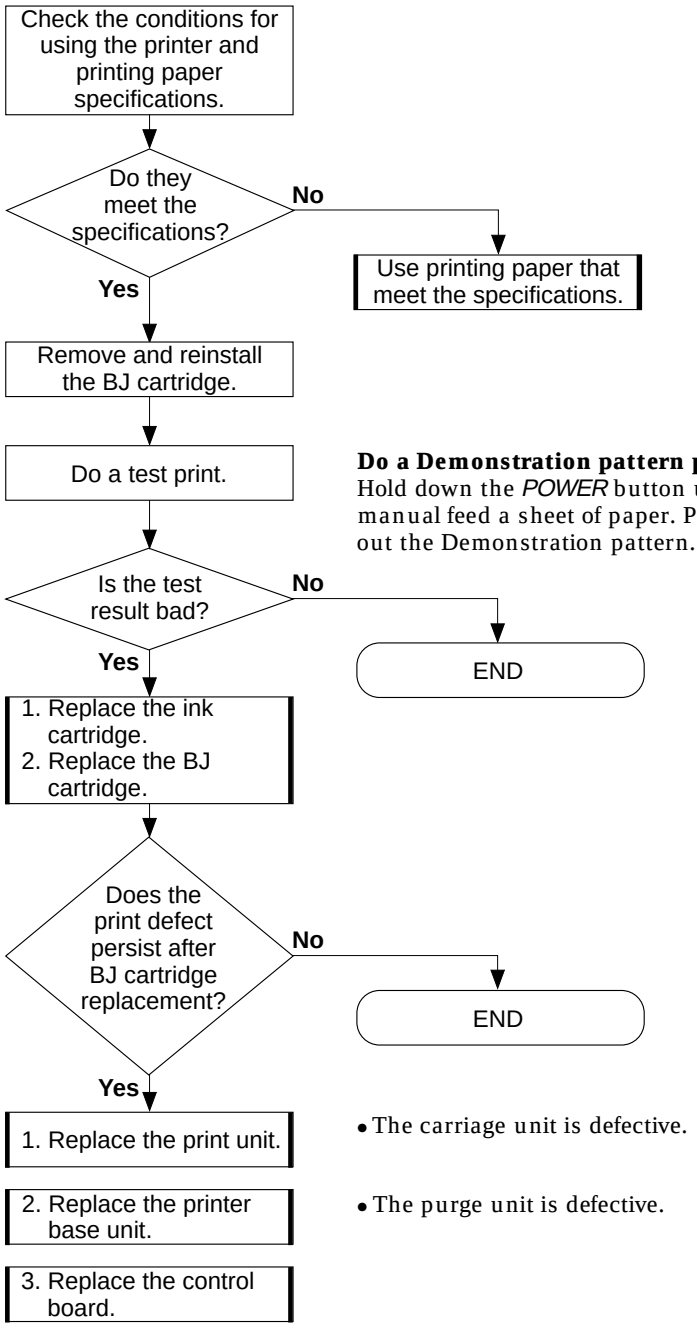
Figure 5-9 Head Connector

4. Print Defect <1> The Printer Does Not Print.

<Symptom>
- The printer does not print at all.
- The printer does not print in the middle.
- The printer does not print one or more colors.

<Cause> No ink, defective BJ cartridge, defective control board, defective carriage ribbon cable, defective purge unit

<Measure>


Check the conditions for using the printer and printing paper specifications.
Do they meet the specifications?
No
Use printing paper that meet the specifications.
Yes
Remove and reinstall the BJ cartridge.
Do a test print.
Is the test result bad?
No
END
Yes
1. Replace the ink cartridge.
2. Replace the BJ cartridge.
Does the print defect persist after BJ cartridge replacement?
No
END
Yes
1. Replace the print unit.
2. Replace the printer base unit.
3. Replace the control board.

Do a Demonstration pattern print.
Hold down the *POWER* button until the beeper sounds once and manual feed a sheet of paper. Press the *RESUME* button to print out the Demonstration pattern.

- The carriage unit is defective.
- The purge unit is defective.

5. Print Defect <2> White Streakes Appear.

<Symptom> • The print is blurred.
• White streaks appear.

<Cause> The BJ cartridge, carriage ribbon cable, purge unit, or paper feed unit is defective (missing gear teeth).

<Measure>

Check the conditions for using the printer and printing paper specifications.

Do they meet the specifications?

No → Use printing paper that meet the specifications.

Yes

Remove and reinstall the BJ cartridge.

Do a test print.

Is the test result bad?

No → END

Yes

1. Replace the ink cartridge.
2. Replace the BJ cartridge.

Does the print defect persist after BJ cartridge replacement?

No → END

Yes

Check conductivity of the carriage ribbon cable.

Is it broken?

No

1. Replace the printer base unit. — •The purge unit is defective.
2. Replace the print unit. — •The purge drive unit is defective.

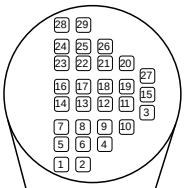
Yes

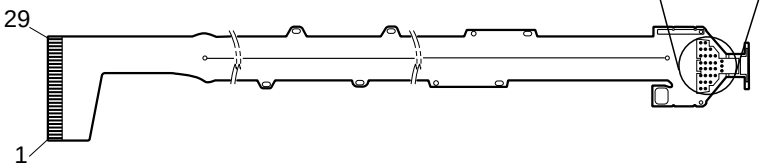
Replace the print unit. — •The carriage unit or carriage ribbon cable is defective.

White Line Sample

Troubleshooting consists of error cor
diagnosis, which is required if the cau
is unknown, and error recovery, whic
if the cause of an error is known. If t
an error is unknown, perform the err
diagnosis, and if it is known, perform
recovery.

Do a Demonstration pattern print.
Hold down the *POWER* button until the beeper sounds once and manual feed a sheet of paper. Press the *RESUME* button to print out the Demonstration pattern.





6. Print Defect <3> Other Print Problems

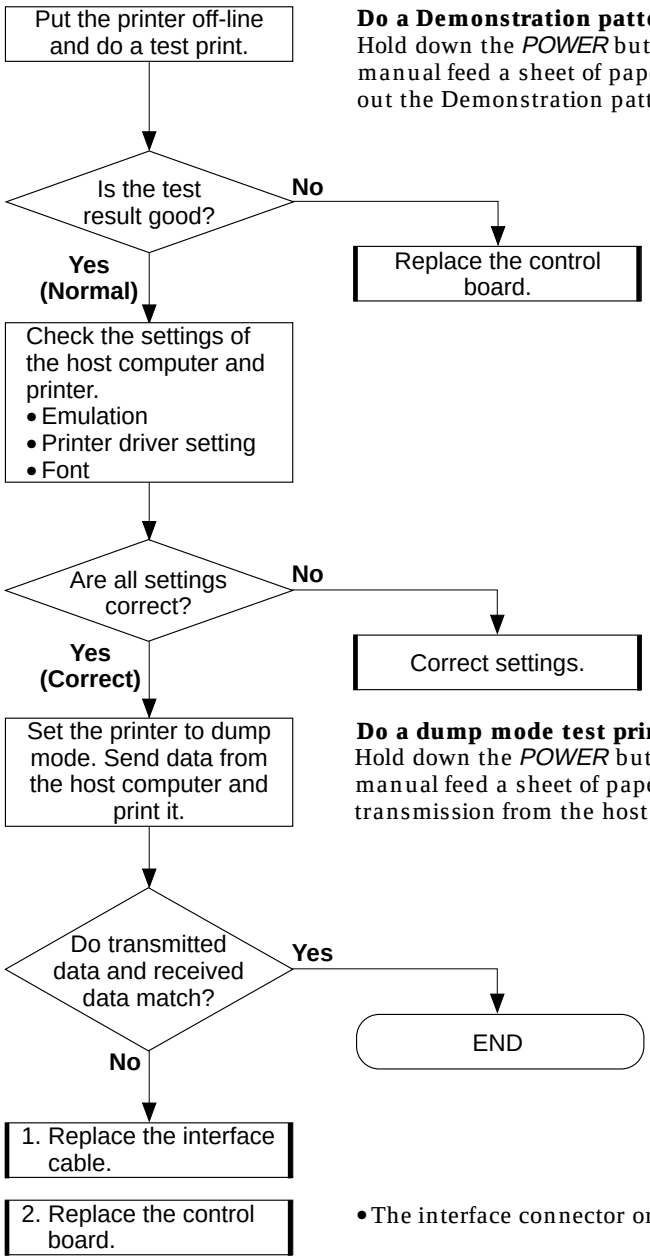
Symptom	Check Item	Measures
• Smeared paper	Ink mist on the platen.	Use a soft cloth moistened with water to clean.
	Ink has clogged around the head's nozzles. (No smearing during paper feeding and discharging).	Clean a few times, If the problem persists, replace the BJ cartridge.
	Ink has clogged or paper bits have stuck around the purge unit's head wiper or head capping area.	Replace printer base unit.
	Ink has adhered to the paper transport system. (The paper is already smeared by the time it reaches the platen).	Clean the paper feed roller and the platen.
• Spur tracks appear	Ink has adhered to the spurs.	Use a soft toothbrush to clean.
	Spurs have deformed	Replace the print unit.
• Misaligned vertical lines appear	The BJ cartridge is installed incorrectly.	Reinstall the BJ cartridge correctly.
	The problem re-occurs when the user's BJ cartridge (causing the problem) is installed in a normally-operating printer.	Replace the BJ cartridge.
• Corrugated printing	Chassis is deformed.	Replace the print unit.
	Frinctional wear between the carriage unit and the carriage shaft.	Replace the print unit.
• Irregular darkness of printout	Check the printing mode.	Reset the printing mode.
	BJ cartridge is faulty.	Replace the BJ cartridge.

7. Faulty Interface

<Symptom> • No printing
• An unspecified font is used to print characters.
• Text is printed in an unspecified color.

<Cause> The printer driver is set incorrectly.
The interface cable is defective.
The control board is defective. (Printer)

<Measure>


Put the printer off-line and do a test print.
Is the test result good?
No
Replace the control board.
Yes (Normal)
Check the settings of the host computer and printer.
• Emulation
• Printer driver setting
• Font
Are all settings correct?
No
Correct settings.
Yes (Correct)
Set the printer to dump mode. Send data from the host computer and print it.
Do transmitted data and received data match?
Yes
END
No
1. Replace the interface cable.
2. Replace the control board.

Do a Demonstration pattern print.
Hold down the *POWER* button until the beeper sounds once and manual feed a sheet of paper. Press the *RESUME* button to print out the Demonstration pattern print.

Do a dump mode test print.
Hold down the *POWER* button until the beeper sounds 5 times and manual feed a sheet of paper. The printer stands by for data transmission from the host computer.

• The interface connector or ASIC is defective.

8. Scanner Cartridge: Installation Problems

Symptom	Check Item	Measures
No head error message	Scanner cartridge is installed incorrectly.	Press the cartridge button, move the carriage to the cartridge replacement position and reinstall the cartridge correctly. Restart using the power button.
Head mismatch error message	Scanner cartridge is installed incorrectly.	Press the cartridge button, move the carriage to the cartridge replacement position and reinstall the cartridge correctly. Restart using the power button.
	Driver not set to scanner mode.	Activate the scanner driver in the host computer. Switch setting to scanner mode.
Paper feed error message	Scanning document is jammed.	Press the RESUME button to erase the error message.
	Check scanning document size. Check scanning document thickness.	Place the document between the scanning folder and rescan.
Paper delivery error message	Scanning document is jammed.	Remove jammed document.
	Check scanning document length.	Make sure the scanning document fits within the scanning folder.
Irregular scanned graphic image	Check if white standard was taken using the white calibration sheet.	Recalibrate the white standard.
	Check the scanner driver setting.	Reset the scanner driver.
	Problems occur when the user's faulty scanner cartridge is installed.	Replace the scanner cartridge.
	Check computer-printer connection.	Reconnect cables.

6. CONNECTOR POSITION & PIN ALIGNMENT

6.1 Control Board

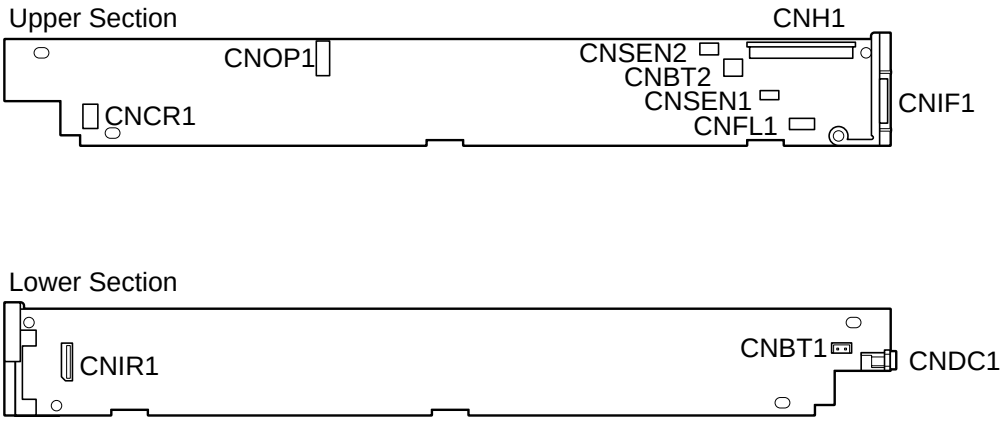


Figure 5-10 Control Board

CNIF1 (Parallel Interface Connector)

Pin No.	Signal name	IN/OUT	Description
1	$\overline{\text{STROBE}}$	IN	See *Part 2: 2.3.1 Parallel Interface for details (page 2-15)*
2	DATA1	IN/OUT	
3	DATA2	IN/OUT	
4	DATA3	IN/OUT	
5	DATA4	IN/OUT	
6	DATA5	IN/OUT	
7	DATA6	IN/OUT	
8	DATA7	IN/OUT	
9	DATA8	IN/OUT	
10	$\overline{\text{ACKNLG}}$	OUT	
11	BUSY	OUT	
12	P.E.		
13	GND		
14	GND		
15	SELECT	OUT	
16	$\overline{\text{AUTO FEED XT}}$	IN	
17	+5.0V		
18	$\overline{\text{INIT}}$	IN	
19	$\overline{\text{ERROR}}$	OUT	
20	+5.0V		
21	$\overline{\text{SELECT IN}}$	IN	
22	GND		
23	N.C.		
24	GND		
25	GND		
26	N.C.		

CNH1 (Cartridge Ribbon Cable Connector)

Pin No.	Signal name	IN/OUT	Description / (scanner cartridge in use)
1	VHG (LAMPG)	...	GND for head drive voltage VH (GND for scanner drive voltage 24V)
2	VHG (LAMPG)	...	GND for head drive voltage VH (GND for scanner drive voltage 24V)
3	MCH0 (N.C.)	IN	Drive signal for temperature control heater (Unused)
4	MCH1 (N.C.)	IN	Drive signal for temperature control heater (Unused)
5	HVH (VLAMP)	OUT	Head drive voltage (Scanner drive voltage)
6	HVH (VLAMP)	OUT	Head drive voltage (Scanner drive voltage)
7	WHT (N.C.)	OUT	Drive signal for subheater (Unused)
8	N.C. (N.C.)	...	Unused (Unused)
9	TOP (TOPS)	IN	Detection signal for rank resistance (Scanner cartridge recognition signal)
10	DIA (C.CHA)	IN	Head temperature sensor (diode) anode (Scanner cartridge recognition signal)
11	ID0 (ID0)	IN	BJ cartridge (black/color) detection signal (Scanner monochrome/color detection signal)
12	ID1 (ID1)	IN	BJ cartridge (black/color) detection signal (Scanner monochrome/color detection signal)
13	HCONT (INKS2)	IN	BJ cartridge (BC-11/BC-11e) detection signal (IS-11/IS-12 detection signal)
14	HVSS (VSS)	...	GND for head's logic drive voltage (GND for scanner's PCB drive voltage)
15	HENBD (N.C.)	OUT	Head's heater drive signal (Unused)
16	EVEN ENB (N.C.)	OUT	Even nozzle heater drive signal (Unused)
17	HENBA (N.C.)	OUT	Head's heater drive signal (Unused)
18	HENBC (N.C.)	OUT	Head's heater drive signal (Unused)
19	ODD ENB (REN)	OUT	Odd nozzle heater drive signal (Scanner's register setting signal)
20	BENB0 (RWR)	OUT	Block enable decoder generation signal (Scanner's clock signal for serial data transfer to register)
21	BENB1 (RDT)	OUT	Block enable decoder generation signal (Scanner's serial data signal)
22	BENB2 (N.C.)	OUT	Block enable decoder generation signal (Unused)
23	HVDD (VDD)	OUT	Head's logic drive voltage +5V (Scanner's PCB drive voltage +5V)
24	HCLOCK (DTCK)	OUT	Clock signal for print data transfer (Clock signal for scanning data input)
25	HLATCH (LNST)	OUT	Timing signal to latch print data (Timing signal to start scanning)
26	HRES (SRES)	OUT	Latch reset signal (Scanning operation reset signal)
27	HENBB (N.C.)	OUT	Head's heater drive signal (Unused)
28	HDATA (DT)	OUT	Print data (Scanning data)
29	DIK (C.CHK)	IN	Head temperature sensor (diode) cathode (Scanner cartridge recognition signal)

CNIR1 (IrDA Module Connector)

Pin No.	Signal name	IN/OUT	Description
1	GND		
2	MODE	OUT	IrDA unit type switch signal
3	+5.0V (Vcc1)		
4	GND		
5	RXD/PRXD	IN/OUT	Infrared light transmitting & receiving signal
6	GND		
7	TXD/PTXD	IN/OUT	Infrared light transmitting & receiving signal
8	GND		
9	+5.0V (Vcc1)		
10	GND		

The BJ cartridge or the scanner cartridge is recognized by the pin No. of connector CNH1 on the control board or by a combination of ID1 and ID0 as shown below.

Pin No.	Signal name	Cartridge type
11	ID0	Low / Low — Black; High / Low — Color, scanner
12	ID1	
13	HCONT	Low (BC-11e), (IS-12) / High (BC-10, BC-11)

CNLF1 (Paper feed motor connector)

Pin No.	Signal name	IN/OUT	Description
1	COM	IN	Paper feed motor drive voltage +20.0 VDC
2	LF B	OUT	Paper feed motor phase B
3	LF A	OUT	Paper feed motor phase A
4	$\overline{\text{LF A}}$	OUT	Paper feed motor phase $\overline{\text{A}}$
5	$\overline{\text{LF B}}$	OUT	Paper feed motor phase $\overline{\text{B}}$

CNCR1 (Carriage motor connector)

Pin No.	Signal name	IN/OUT	Description
1	$\overline{\text{CR B}}$	OUT	Carriage motor phase $\overline{\text{B}}$
2	CR B	OUT	Carriage motor phase B
3	$\overline{\text{CR A}}$	OUT	Carriage motor phase $\overline{\text{A}}$
4	CR A	OUT	Carriage motor phase A

CNDC1 (DC power connector)

Pin No.	Signal name	IN/OUT	Description
1	VIN	IN	+13 VDC
2	-VIN	IN	Negative (-) side of DC input voltage
3	GND		

CNBT1/CNBT2 (Lithium ion battery connector)

Pin No.	Description	Connector Position
CNBT1 1	Lithium ion battery "+" terminal	Control board
CNBT1 2	Lithium ion battery "–" terminal	(Lower section)
CNBT2 1	Lithium ion battery thermistor terminal	Control board
CNBT2 2	Lithium ion battery ON/OFF output control terminal	(Upper section)

CNOP1 (Optional ASF and Connector)

Pin No.	Signal name	IN/OUT	Description
1	OP-VH	OUT	Motor drive (24V power supply)
2	OP-Vcc1	OUT	Microcomputer drive (5V power supply)
3	RXD0	IN/OUT	Serial data receiver
4	TXD0	IN/OUT	Serial data transmitter
5	SCLK0	IN	Paper end sensor read signal
6	+5.0V (Vcc3)		
7	OP-ON	IN	Power on/off drive control signal
8	GND		

CNSEN1 (Home Position Sensor/Paper End Sensor Connectors)

Pin No.	Signal name	IN/OUT	Description
1	PES	OUT	Paper end sensor sensing signal
2	+5.0V (Vcc1)		
3	GND		
4	HPS	OUT	Home position sensor sensing signal
5	+5.0V (Vcc3)		
6	RTC (Vdd)		Timer IC drive signal
7	GND		

CNSEN2 (Paper Delivery Sensor Connectors)

Pin No.	Signal name	IN/OUT	Description
1	+5.0V (Vcc3)		
2	FIRRXD	OUT	Delivery sensor sensing signal
3	+5.0V (Vcc3)		

6.2 Carriage Ribbon Cable

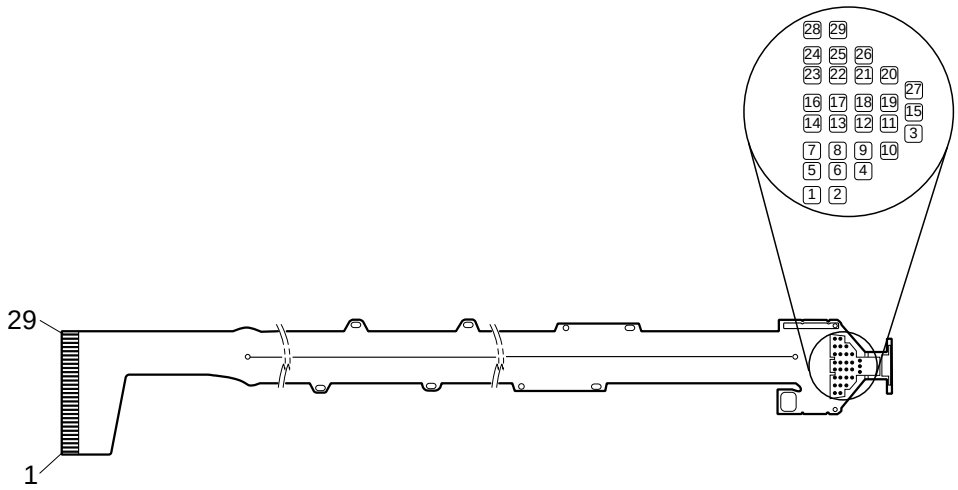


Figure 5-11 Carriage Ribbon Cable

Pin No.	Signal name	IN/OUT	Description	To BJ cartridge
1	VHG		See CNH1	GNDH
2	VHG			GNDH
3	MCH0	OUT		MCH1
4	MCH1	OUT		MCH2
5	HVH			VH
6	HVH			VH
7	WHT	IN		SUB
8	N.C			Spare 1
9	TOP	OUT		RNK
10	DIA	IN		DIA
11	ID0	OUT		ID0
12	ID1	OUT		ID1
13	HCONT	OUT		IND
14	HVSS			GNDL
15	HENBD	IN		HEAT-D
16	EVENENB	IN		EVEN
17	HENBA	IN		HEAT-A
18	HENBC	IN		HEAT-C
19	ODDENB	IN		ODD
20	BENB0	IN		B-ENB0
21	BENB1	IN		B-ENB1
22	BENB2	IN		B-ENB2
23	HVDD	IN		VDD
24	HCLOCK	IN		D-CLK
25	HLATCH	IN		LT-CLK
26	HRES	IN		RESET
27	HENBB	IN		HEAT-B
28	HDATA	IN		I-DAT
29	DIK	OUT		DIK

6.3 BJ Cartridge

BC-11e

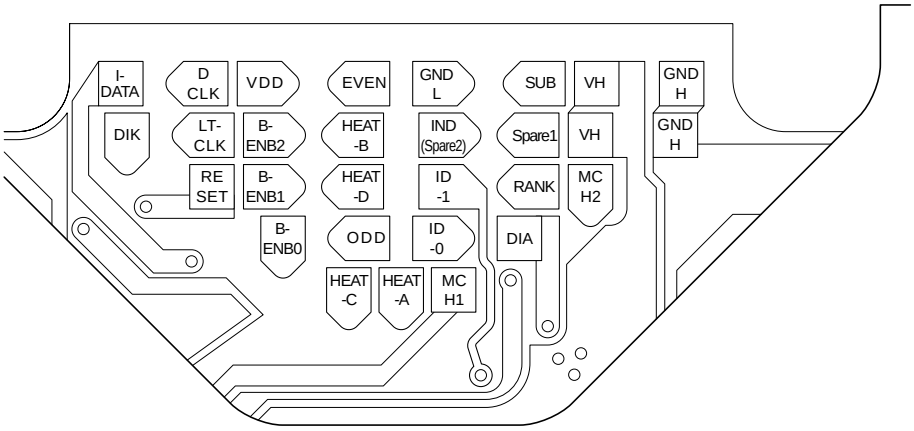


Figure 5-12 BC-11e Contact Pad

6.4 Scanner Cartridge IS-12

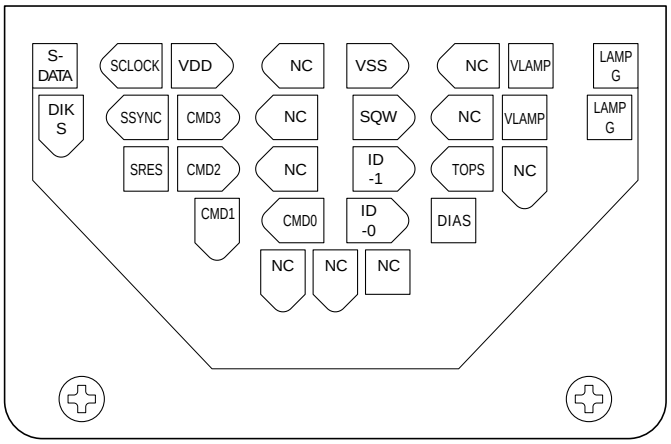
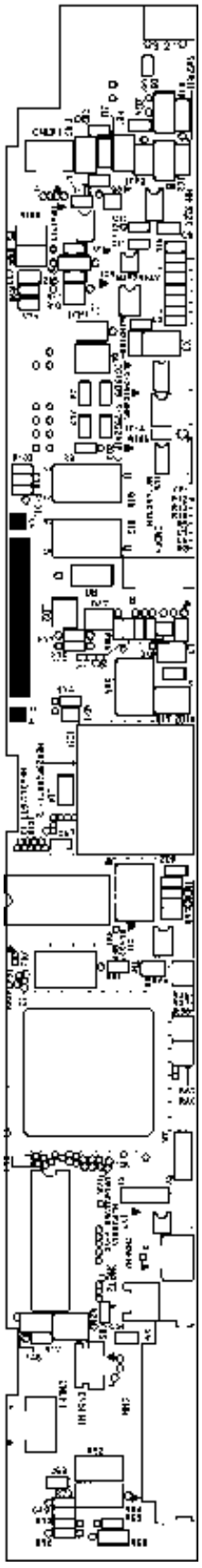


Figure 5-13 IS-12 Contact Pad

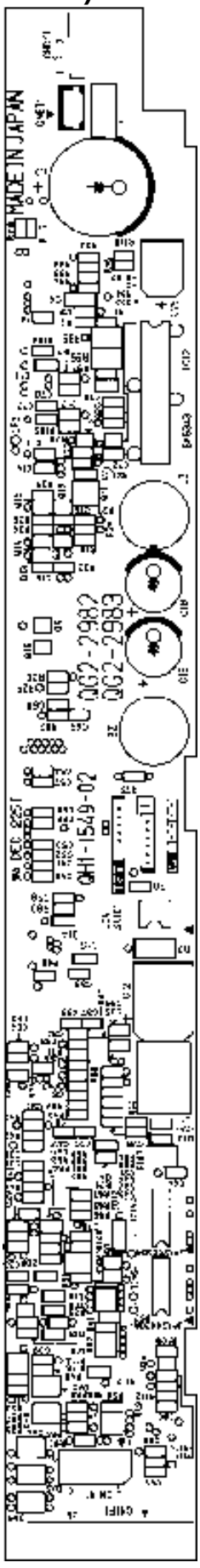
7. CIRCUIT DIAGRAMS

7.1 Parts Layout

7.1.1 Control board (Upper section)



7.1.2 Control board (Lower section)



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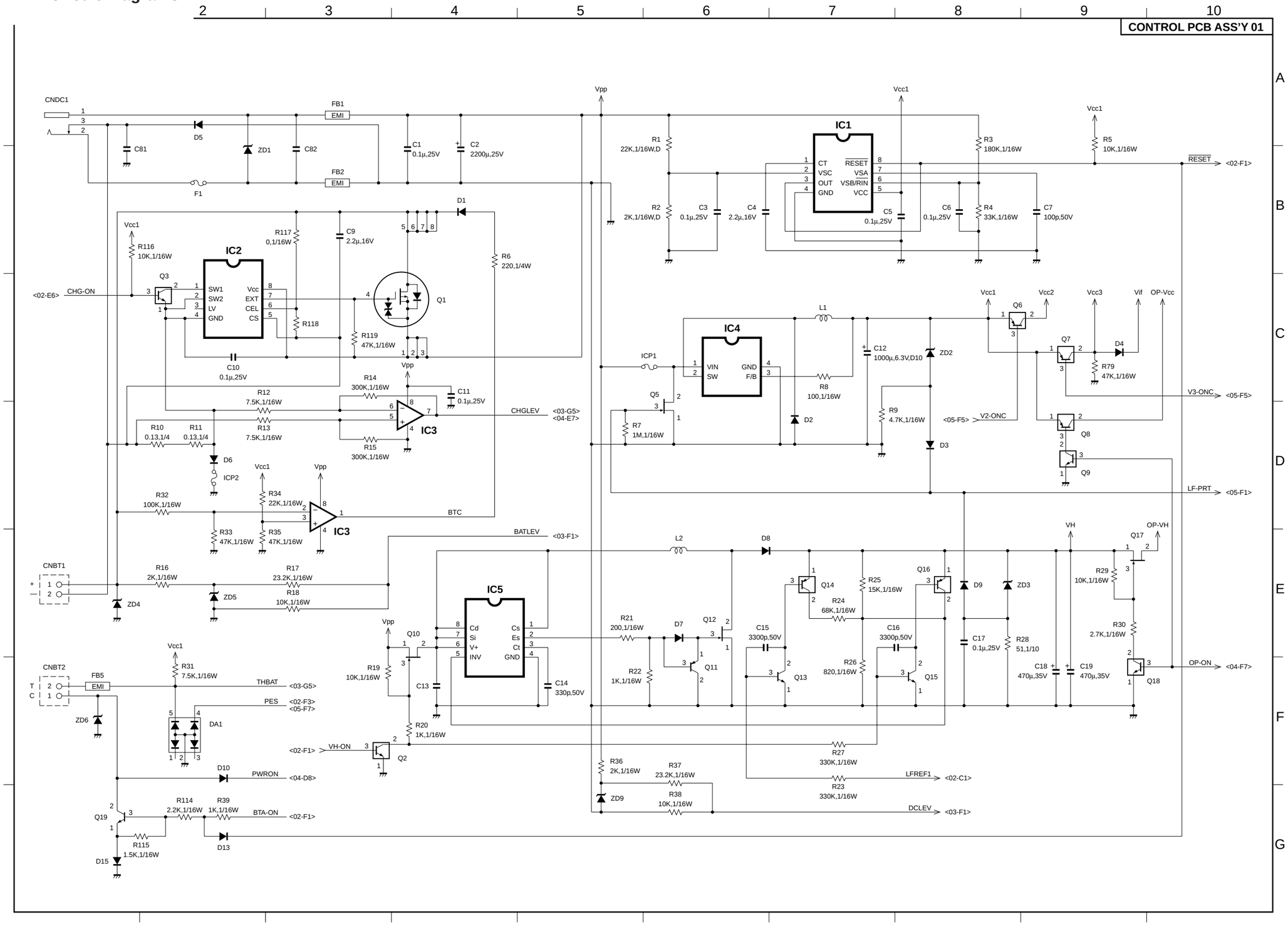
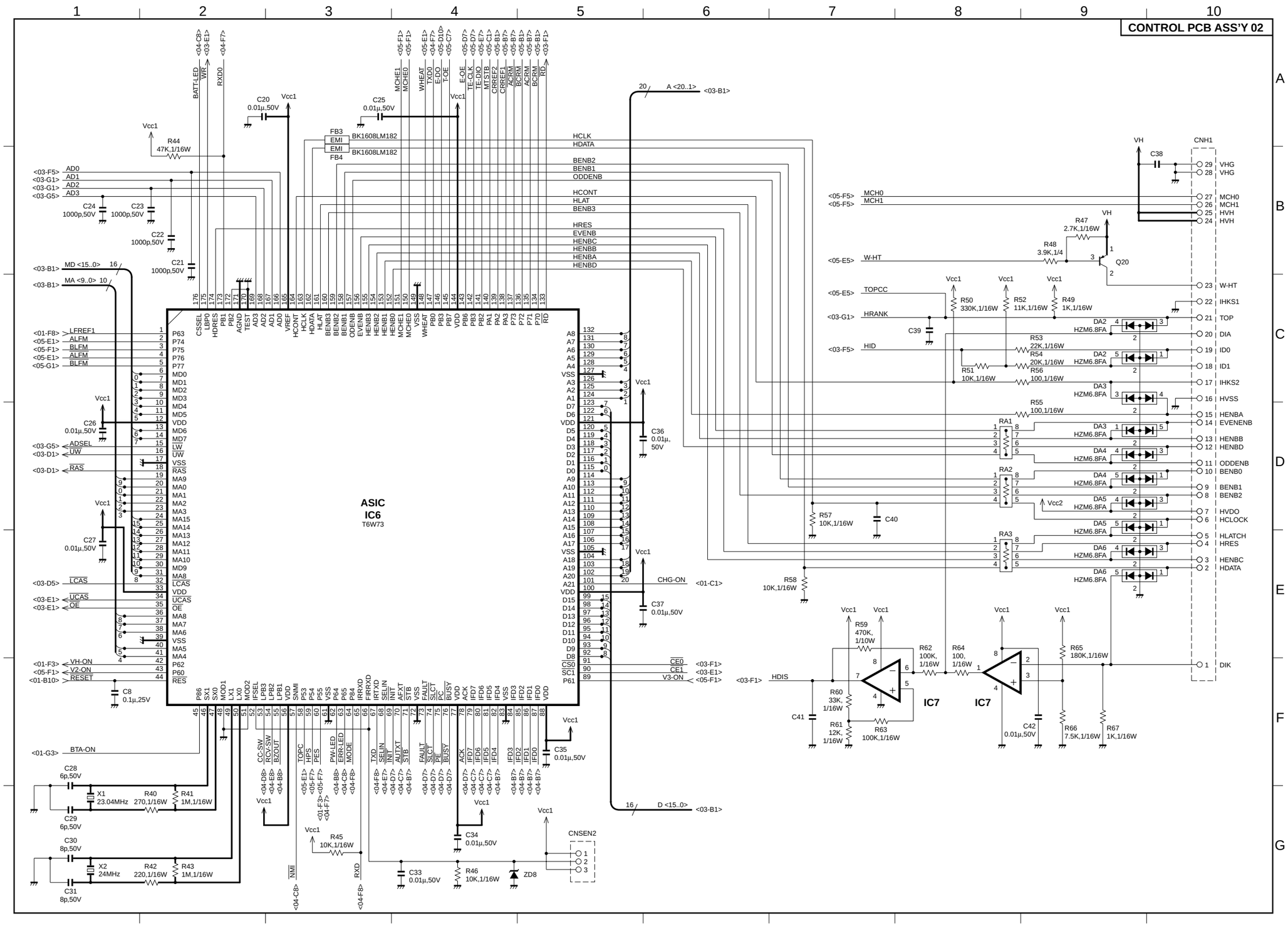
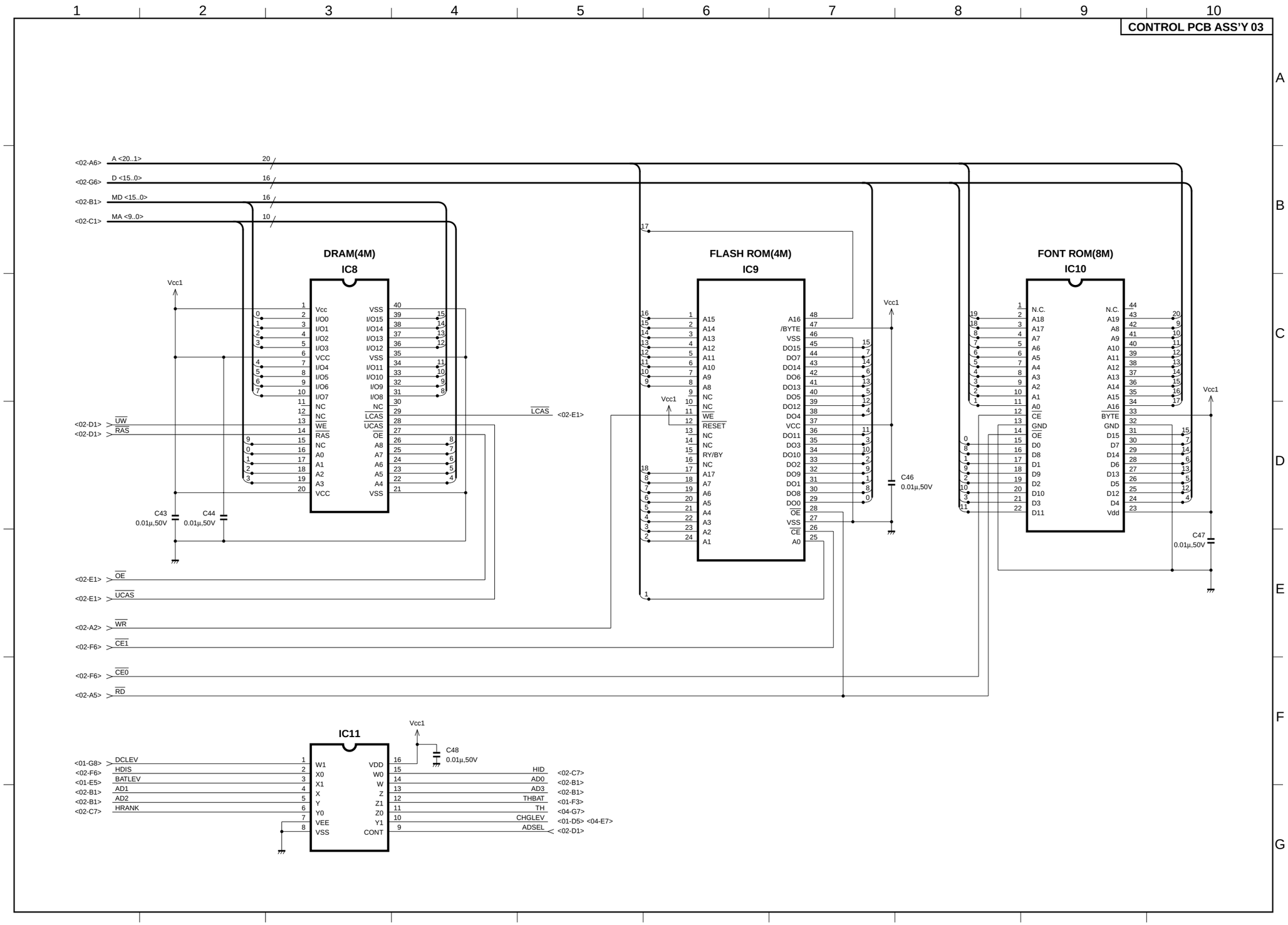
7.2 Circuit Diagrams




CONTROL PCB ASS'Y 02
ASIC
IC6
T6W73
IC7
IC7
CNH1
VH
Vcc1
Vcc2
BATT-LED
WR
RXD0
MCHE1
MCHE0
WHEAT
TXD0
E-DO
T-OE
E-OE
TE-CLK
TE-DIO
TE-STB
CRREF1
CRREF2
ACRM
BCRM
RD
A <20..1>
D <15..0>
HCLK
HDATA
BENB2
BENB1
ODDENB
HCONT
HLAT
BENB3
HRES
EVENB
HENBC
HENBB
HENBA
HENBD
MD <15..0>
MA <9..0>
ADSEL
UW
RAS
LCAS
UCAS
OE
VH-ON
V2-ON
RESET
BTA-ON
CHG-ON
CE0
CE1
V3-ON
HDIS
TOPCC
HRANK
HID
W-HT
MCH0
MCH1
VHG
HVH
IHKS1
TOP
DIA
ID0
ID1
IHKS2
HVSS
HENBA
EVENENB
HENBB
HENBD
ODDENB
BENB0
BENB1
BENB2
HVDO
HCLOCK
HLATCH
HRES
HENBC
HDATA
DIK
NMI
RXD
TOPC
HPS
PES
PW-LED
ERR-LED
MODE
TXD
SELIN
INIT
AUTOXT
STB
FAULT
SLCT
PE
BUSY
ACK
IFD7
IFD6
IFD5
IFD4
IFD3
IFD2
IFD1
IFD0
CC-SW
RCV-SW
BZOUT
LFREF1
ALFM
BLFM
ALFM
BLFM
FB3
FB4
EMI
BK1608LM182
X1
23.04MHz
X2
24MHz
ZD8
Q20
CNSEN2


CONTROL PCB ASS'Y 03
A <20..1>
D <15..0>
MD <15..0>
MA <9..0>
<02-A6>
<02-G6>
<02-B1>
<02-C1>
DRAM(4M)
IC8
FLASH ROM(4M)
IC9
FONT ROM(8M)
IC10
Vcc1
C43 0.01µ,50V
C44 0.01µ,50V
C46 0.01µ,50V
C47 0.01µ,50V
<02-D1> UW
<02-D1> RAS
LCAS
<02-E1>
<02-E1> OE
<02-E1> UCAS
<02-A2> WR
<02-F6> CE1
<02-F6> CE0
<02-A5> RD
IC11
C48 0.01µ,50V
<01-G8> DCLEV
<02-F6> HDIS
<01-E5> BATLEV
<02-B1> AD1
<02-B1> AD2
<02-C7> HRANK
HID <02-C7>
AD0 <02-B1>
AD3 <02-B1>
THBAT <01-F3>
TH <04-G7>
CHGLEV <01-D5> <04-E7>
ADSEL <02-D1>
A B C D E F G
1 2 3 4 5 6 7 8 9 10

CONTROL PCB ASS'Y 04

CNIF1: STROBE, DATA1, DATA2, DATA3, DATA4, DATA5, DATA6, DATA7, DATA8, ACK, BUSY, PE, NC, NC, SLCT, AUTXT, +5V, INPRM, FAILT, +5V, SELIN, S-GND, NC, S-GND, S-GND, NC

R68 390,1/8W; R69 5.6K,1/16W; R70 1K,1/16W; R71 1K,1/16W; R72 100,1/16W; R73 1K,1/16W; C49 1000p,50V

RA4, RA5, RA6, RA7

C50–C57 1000p, 50V

R78 1K,1/16W; R87 100,1/16W; R88 1K,1/16W; C61 0.01µ,50V; C62–C66 1000p, 50V; R89 1K,1/16W

$\overline{STB}$ <02-F4>
IFD0–IFD7 <02-F5>/<02-F4>
AUTXT <02-F4>
ACK <02-F4>
$\overline{BUSY}$ <02-F4>
$\overline{PE}$ <02-F4>
$\overline{SLCT}$ <02-F4>
FAULT <02-F4>
$\overline{INIT}$ <02-F4>
SELIN <02-F3>

<02-F3> BZOUT — BZ1, BZ, R74 1.5K,1/16W, Q21

<02-F3> PW-LED — R75 300,1/16W — LD1

<02-F3> ERR-LED — R76 300,1/16W; <02-A2> BATT-LED — R77 300,1/16W — LD2

<02-G3> $\overline{NMI}$; <01-F3> PWRON — R80 10K,1/16W, D14, C58 0.01µ,50V, SW1, SW2, GND

<02-F2> CC-SW — R81 10K,1/16W, C59 0.01µ,50V, SW3, GND

<02-F3> RCV-SW — R82 10K,1/16W, C60 0.01µ,50V, SW4, GND

Option ASF

CNOP1: OP-VH, ZD10, L4, L5, R85 1K,1/16W

DA8, DA7

CHGLEV <01-D5>/<03-G5>
RXD0 <02-A2>
TXD0 <02-A4>
SCLK0 (PES) <02-F3>
OP-ON <01-F10>

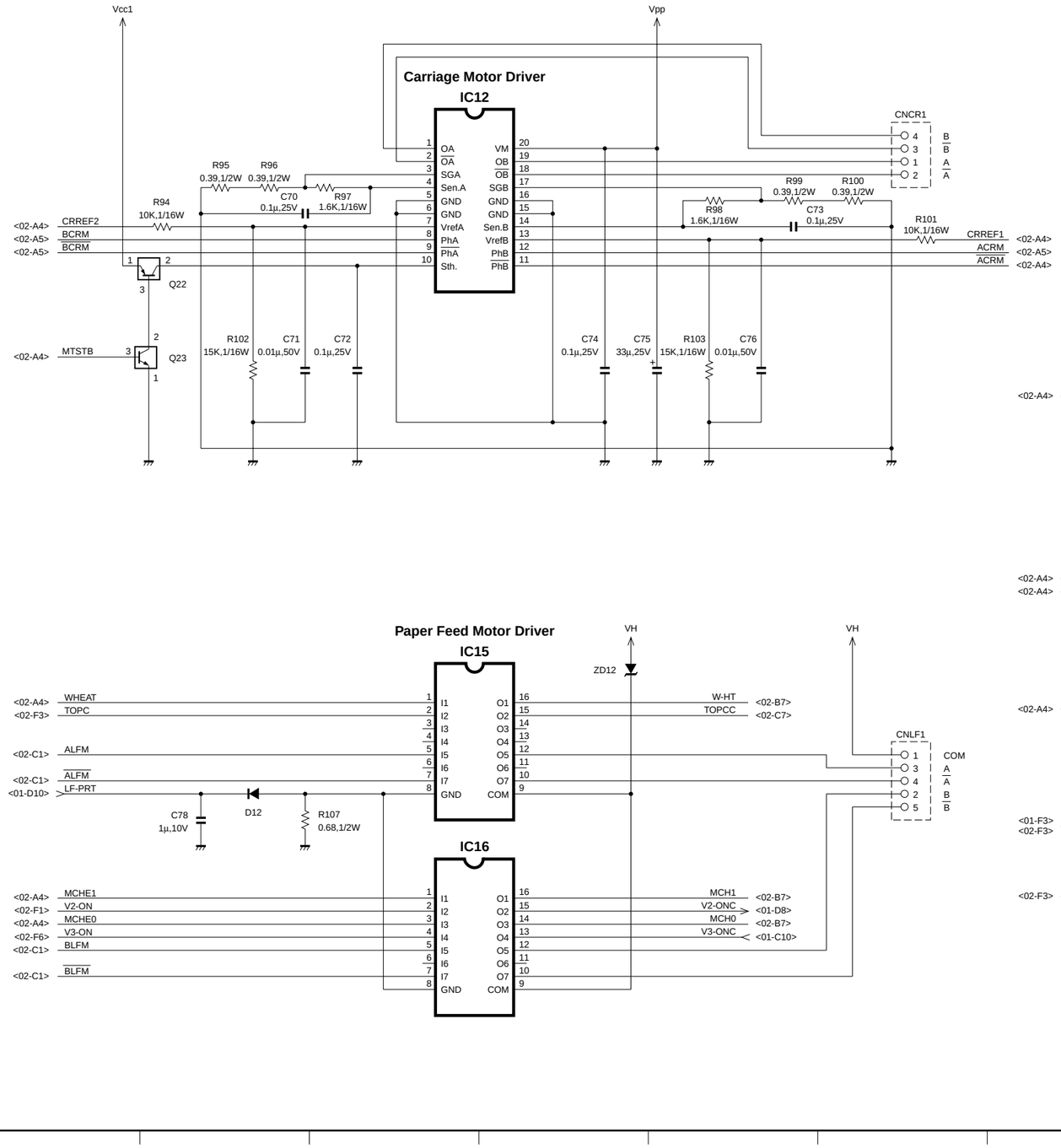
OP-Vcc, Vcc3, Vcc1, TH1, R86 47K,1/16W
TH <03-G5>

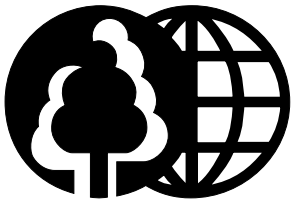
<02-F3> MODE; <02-G3> RXD; <02-F3> TXD — R90 68,1/16W

L3 0.1A; C67 0.1µ,25V; C68 0.1µ,25V; C69 4.7µ,10V; R92 12,1W; R93 12,1W

CNIR1 (IR)

CONTROL PCB ASS'Y 05





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